A dot (●) indicates material that has been revised since publication of the Draft EIR. Long changes are indicated with opening dots (❶) and closing dots (❶).

CANDLESTICK POINT–HUNTERS POINT SHIPYARD PHASE II DEVELOPMENT PLAN PROJECT

Final Environmental Impact Report

Volume I: Final EIR Executive Summary
Administrative Draft 1

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Executive Summary

PURPOSE OF THE SUMMARY

This summary is intended to highlight the major areas of importance in the environmental analysis for the Project as required by Section 15123 of the *California Environmental Quality Act* (CEQA) Guidelines. The summary includes a brief description of the Project, the Project objectives, approval requirements, areas of controversy/issues to be resolved, and a summary of alternatives to the Project. In addition, this chapter provides a table summarizing (1) potential environmental impacts that would occur as a result of the Project; (2) the level of significance of the environmental impacts prior to implementation of any applicable mitigation measures; (3) the recommended mitigation measures that avoid or reduce significant environmental impacts; and (4) the level of significance after mitigation measures are implemented (refer to Table ES-2 [Summary of Environmental Effects and Project Requirements/Mitigation Measures] at the end of this chapter).

PROJECT DESCRIPTION

The Project is located on approximately 702-acres east of United States Route 101 (US-101) in the southeast area of the City and County of San Francisco (City). It occupies the waterfront area from south of India Basin to Candlestick Cove. Figure II-1 (Project Location) illustrates the regional location of the Project and the location of the Project within the City.

The Project proposed by Lennar Urban includes a mixed-use community with a wide range of residential, retail, office, research and development, civic and community uses, and parks and recreational open space. A major component would be a new stadium for the San Francisco 49ers National Football League (NFL) team. Additionally, new transportation and utility infrastructure would serve the Project including a bridge across Yosemite Slough.

Specifically, the Project proposes development of 10,500 residential units with an associated population of 24,465 residents; 885,000 gross square feet (gsf) of retail; 150,000 gsf of office; 2.5 million gsf of Research & Development (R&D) uses; a 220-room, 150,000 gsf hotel; 255,000 gsf of artist live/work space; 100,000 gsf of community services; 251.3 acres of new parks, sports fields, and waterfront recreation areas, as well as 84 acres of new and improved State parkland; a 69,000-seat 49ers stadium; and a 75,000 gsf performance arena. The permanent employee population associated with the Project would be 10,730.

In addition, a 300-slip marina would be provided. Shoreline improvements would also be provided to stabilize the shoreline. The Project would include structured and on-street parking and various infrastructure improvements to support the development.

The Project includes amendments of the Bayview Hunters Point and Hunters Point Shipyard Redevelopment Plans, and amendments of the San Francisco General Plan and *Planning Code*, consistent with the development project.

PROJECT OBJECTIVES

Project objectives are identified to both describe the underlying purpose of the Project and to guide the selection of potential Project alternatives. CEQA Guidelines Section 15126.6(a) requires that an EIR "describe a reasonable range of alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives but would avoid or substantially lessen any of the significant effects of the project." Typically, project objectives represent a combination of both the Lead Agency and the developer's intent and purpose in moving forward with the project.

In May 2007, the Board of Supervisors and the Mayor approved a resolution endorsing a Conceptual Framework for the integrated planning of both Hunters Point Shipyard and Candlestick Point. The Conceptual Framework was the result of a long planning process undertaken by the City and County of San Francisco, acting by and through the Mayor's Office of Economic and Workforce Development, the Redevelopment Agency of the City and County of San Francisco, and Lennar Urban.

The City's overarching goal for the Project is to revitalize the Bayview Hunters Point community by providing increased business and employment opportunities; housing options at a range of affordability levels; improved public recreation and open space amenities; an integrated transportation, transit, and infrastructure plan; and other economic and public benefits, all of which would collectively have no net negative impact on the City's General Fund.

Subsequently, and in response to the Conceptual Framework, the San Francisco voters approved Proposition G in June 2008, which is called the Bayview Jobs, Parks, and Housing Initiative ("the Initiative"). Proposition G repealed Proposition F, which had established a special use district for the Project site; instead, Proposition G proposed that new zoning be established along with a land use program (Proposition G is included as Appendix B to this EIR). The Initiative states that the Project must be consistent with the following objectives, which are also identified in this EIR as the Project's objectives:

1. The integrated development should produce tangible community benefits for the Bayview and the City, and in so doing should:
   - Improve the Candlestick Point State Recreation Area to enhance public access to the waterfront and enjoyment of the Bay
   - Create new public recreational and public open spaces in the Candlestick Point-Hunters Point Shipyard Development Plan (CP-HPS Development Plan)
   - Preserve the shoreline of the CP-HPS Development Plan site primarily for public park and public open space uses, including an extension of the Bay Trail along the waterfront
   - Create a range of job and economic development opportunities for local, economically disadvantaged individuals and business enterprises, particularly for residents and businesses located in the Bayview
   - Provide neighborhood-serving retail
   - Subsidize the creation of permanent space in the Shipyard for the existing artists
   - Transform the contaminated portions of the Shipyard Property into economically productive uses or public open space, as appropriate

- Implement the CP-HPS Development Plan with public benefits, whether or not the 49ers decide to remain in San Francisco, including developing alternate uses for the stadium site on the Shipyard Property that are consistent with the overall CP-HPS Development Plan objectives

2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger BVHP neighborhood and should maintain the character of the Bayview for its existing residents, and in so doing should:
   - Foster the creation of strong commercial, institutional, cultural and urban design ties between the development on Candlestick Point and the Hunters Point Shipyard and the Bayview in particular and the City in general
   - Provide automobile, public transportation, and pedestrian connections between the Shipyard, Candlestick Point, and the larger BVHP neighborhood
   - Create substantial affordable housing, jobs, and commercial opportunities for existing Bayview residents and businesses
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourages the rebuilding of Alice Griffith Housing, and in so doing should:
   - Provide new affordable housing that is targeted to the lower income levels of the Bayview population, including new units that are suitable for families, seniors, and young adults
   - Include housing at levels dense enough to create a distinctive urban form and at levels sufficient to make the CP-HPS Development Plan financially viable; attract and sustain neighborhood retail services and cultural amenities; create an appealing walkable urban environment served by transit; help pay for transportation and other infrastructure improvements; and achieve economic and public benefits for the Bayview in particular and the City generally
   - Upon consultation with Alice Griffith Housing residents and the receipt of all required governmental approvals, rebuild Alice Griffith Housing to provide one-for-one replacement units targeted to the same income levels as those of the existing residents and ensure that eligible Alice Griffith Housing residents have the opportunity to move to the new, upgraded units directly from their existing Alice Griffith Housing units without having to relocate to any other area
   - Include a mix of stacked flats, attached townhomes and—in appropriately selected locations—low-rise, mid-rise, and high-rise towers, to help assure the economic feasibility of the development and provide a varied urban form
4. The integrated development should incorporate environmental sustainability concepts and practices, and in so doing should:
   - Apply sustainability principles in the design and development of public open spaces, recreation facilities, and infrastructure including wastewater, storm water, utility, and transportation systems
   - Incorporate green building construction practices
   - Include energy efficiency and the use of renewable energy
   - Encourage green development projects, such as green office, research and development, or industrial projects, including a green technology, biotechnology, or digital media campus
5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure, and in so doing should:
   - Provide the parking necessary to operate the stadium

- Provide the necessary transportation infrastructure, including automobile, public transit and pedestrian connections between Candlestick Point, Hunters Point Shipyard, and the larger BVHP neighborhood, to facilitate the efficient handling of game day traffic

6. The integrated development should be fiscally prudent, with or without a new stadium, and in so doing should:
   - Minimize any adverse impact on the General Fund relating to the development of the Project Site by relying to the extent feasible on the development to be self-sufficient
   - Encourage substantial private capital investment

APPROVAL REQUIREMENTS

Consistent with the intended uses of the EIR, implementation of the Project would require multiple approvals from City, regional, state, and federal agencies. Table ES-1 (Major Project Approvals) presents the major approval requirements.

Table ES-1 Major Project Approvals

CITY AND COUNTY SAN FRANCISCO APPROVAL PROCESS AND PERMITS

Redevelopment Agency Commission

- Certifies the Final EIR
- Adopts CEQA findings, a statement of overriding considerations, and a mitigation monitoring and reporting program
- Reports to the Board of Supervisors on the amendments to Redevelopment Plans
- Approves amendments to the *Hunters Point Shipyard Redevelopment Plan* and approves amendments to the Hunters Point Shipyard Design for Development
- Approves amendments to the *Bayview Hunters Point Redevelopment Plan* and approves a Design for Development for Candlestick Point
- Approves land transfer agreements with the Navy, City, and State agencies
- Approves land transfer agreements with Port Commission, State Lands Commission, and California Department of Parks and Recreation (CDPR)
- Approves Disposition and Development Agreements and Owner Participation Agreements

Port Commission

- Approves land transfer agreements with Agency, State Lands Commission, and CDPR

Planning Commission

- Certifies the Final EIR
- Adopts CEQA findings, a statement of overriding considerations, and mitigation monitoring and reporting program
- Approves shadow determinations/impacts
- Adopts amendments to the General Plan to accommodate the Project and to find the amendments for the *Hunters Point Shipyard Redevelopment Plan* and *Bayview Hunters Point Redevelopment Plan* in conformity with the General Plan
- Adopts resolution recommending to the Board of Supervisors approval of amendments to the Planning Code/Zoning Maps for the Project
- Authorizes cooperative agreement with Redevelopment Agency

Table ES-1 Major Project Approvals

Board of Supervisors

- Affirms certification of Final EIR
- Adopts CEQA findings, a statement of overriding considerations, and a mitigation monitoring and reporting program
- Approves General Plan amendments
- Approves amendments to the *Hunters Point Shipyard Redevelopment Plan* and the *Bayview Hunters Point Redevelopment Plan*
- Approves amendments to the Planning Code/Zoning Maps
- Approves other necessary code amendments
- Approves a Joint Facilities Agreement and Tax Allocation Agreements with the Redevelopment Agency
- Approves land transfer agreements

San Francisco Public Utilities Commission

- Approves Project infrastructure for water, sewer, stormwater, electricity

Department of Building Inspection

- Approves Project construction-related permits.

Department of Public Works

- Approves subdivision maps, public improvements, and infrastructure

Department of Public Health

- Recommends ordinance to Board related to oversight of environmental controls; oversees compliance with environmental controls

Municipal Transportation Authority

- Approves transit improvements

Department of Recreation and Parks

- Approves land transfers
- Recommends to Planning Commission shadow determinations/impacts

Art Commission

- Approves public art and the design of public structures on City property

San Francisco Housing Authority

- Approves replacement of Alice Griffith housing

REGIONAL, STATE, AND FEDERAL APPROVALS

Bay Conservation and Development Commission

- Approves amendments of the Bay Plan and Seaport Plan
- Approves permits for activities within BCDC's jurisdiction, including the proposed Yosemite Slough bridge
- Reviews Project land use plan for federal consistency under the Coastal Zone Management Act for activities not previously authorized in Consistency Determination No. CN 1-99

State Lands Commission

- Approves public trust land exchange agreement

California Department of Parks and Recreation

- Approves agreement for the reconfiguration of Candlestick Point State Recreation Area
- Approves General Plan Amendment for the reconfiguration of Candlestick Point State Recreation Area

California Department of Transportation

- Approves any necessary encroachment permits for the Project roadway improvements

Regional Water Quality Control Board

- Approves Section 401 water quality certification

Table ES-1 Major Project Approvals

Bay Area Air Quality Management District

- Approves any necessary air quality permits for individual uses

Navy

- Authorizes the execution of necessary transactional documents with the Redevelopment Agency to transfer property at Hunters Point Shipyard for the development of the Project

US Army Corps of Engineers

- Approves permit for fill related to the Yosemite Slough bridge, shoreline improvements, and other activities
- Consults with USFWS or NMFS regarding federally listed species prior to carrying out its discretionary authority under Section 404 of the CWA, pursuant to Section 7 of federal ESA
- Consults with NMFS regarding pile-driving and harbor seal and California sea lion prior to carrying out its discretionary authority under Section 404 of the CWA, pursuant to *Marine Mammal Protection Act*
- Consults with NMFS regarding modifying designated EFH prior to carrying out its discretionary authority under Section 404 of the CWA, pursuant to the *Magnuson-Stevens Act*

Department of the Interior

- Approves conversion of portions of Candlestick Point State Recreation Area reconfiguration improved with Land and Water Conservation Fund grants

US Coast Guard

- Issues determination regarding vessel navigability for the Yosemite Slough bridge

US Department of Housing and Urban Development

- Approves land transfer agreements involving Alice Griffith public housing site and funding approvals

SOURCE: Agency, Planning Department.

This Table is not intended to provide an exhaustive or exclusive list of the numerous public agency approvals that may be necessary to carry out the Project over its 20-year build-out. Instead, the Table provides a list of the major land use entitlements and related approvals anticipated from local and State agencies that may rely on this EIR. It is also anticipated that other permit and transactional approvals will be necessary as these major entitlements are implemented and that the approving public agencies, to the extent required by law, will rely on this EIR, in accordance with the requirements of CEQA and the CEQA Guidelines, in granting such approvals. This Table also lists federal agencies that would have jurisdiction over certain aspects of the Project.

AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

This EIR has been prepared by the Redevelopment Agency and the City (Planning Department) as co-lead agencies for the Project, in conformance with the substantive and procedural requirements of CEQA and the CEQA Guidelines (as amended through 2007),[1] Agency CEQA guidelines, Chapter 31 of the *San Francisco Administrative Code*, and Planning Department CEQA guidelines. In accordance with *Public Resources Code* Section 21002.1, the purpose of this EIR is to identify the significant environmental impacts of the Project, to identify alternatives to the Project, and to indicate the manner in which those significant effects could be mitigated or avoided.

This EIR evaluates the Project's environmental effects at a project level of detail and examines all phases of the Project, including planning, construction, and operation, as well as the direct, indirect, and cumulative impacts that might result. It is anticipated that each discretionary approval related to the implementation of the Project would rely on this EIR and would not require preparation of subsequent

[1] *California Environmental Quality Act*, (*Pub. Res. Code* Sec. 21000 et seq.; CEQA) and the CEQA Guidelines (*Cal. Code Regs.* Sec. 15000 et seq.).

environmental documentation, unless otherwise required by CEQA pursuant to *Public Resources Code* Section 21166 and CEQA Guidelines Sections 15162 through 15164.

Lennar Urban filed an Environmental Evaluation application (EE application) with the Planning Department on August 27, 2007. The filing of the EE application initiated the environmental review process as outlined below. The EIR process provides an opportunity for the public to review and comment upon the Project's potential environmental effects and to further inform the environmental analysis. As a first step in complying with the procedural requirements of CEQA, the Notice of Preparation (NOP) process was used to determine whether any aspect of the Project, either individually or cumulatively, may cause a significant effect on the environment and, if so, to narrow the focus (or scope) of the environmental analysis.

The Agency and the City filed the NOP with the California Office of Planning and Research, State Clearinghouse, as an indication that an EIR would be prepared. In turn, the State Clearinghouse distributed the NOP to public agencies and interested parties for a 30-day public review period beginning August 31, 2007. In addition, the NOP was also sent to organizations, companies, and/or individuals that the Agency and the City believed might have an interest in the Project. The purpose of the public review period was to solicit comments on the scope and content of the environmental analysis contained in the Draft EIR. In addition, in order to solicit further comments on the scope and content of the environmental analysis to be included in the EIR, the Agency and the City held two public scoping meetings.

A copy of the NOP is included as Appendix A to this EIR. The NOP included the India Basin Shoreline, which would be evaluated on a programmatic basis, as part of the Project; however, since publication of the NOP, the Agency and the City decided to remove the India Basin Shoreline area from the Project and will analyze development in that area as part of a separate EIR.

This EIR addresses environmental issues that are known or were raised by agencies or interested parties during the NOP public review period for the proposed project. In response to the NOP, nine comment letters were submitted to the Agency and the City by public agencies, organizations, and individuals. The NOP comment letters are summarized below:

- **California Department of Transportation (Caltrans)** provided comments pertaining to traffic volume and congestion on the State Highway System and recommended that a traffic impact analysis be prepared.
- **California Public Utilities Commission (CPUC)** provided comments identifying CPUC as a responsible agency if new at-grade rail crossings were proposed. The letter suggested that the unused railroad tracks leading to the Shipyard be removed as mitigation for development in the area.
- **California Department of Parks and Recreation** provided comments for the analysis of the Project in relation to the Candlestick Point State Recreation Area (CPSRA) and consistency with the adopted CPSRA General Plan. The comments also addressed public access to the shoreline, hazardous materials, proposed transportation improvements, and stormwater.
- **San Francisco Bay Conservation and Development Commission (BCDC)** provided a comment regarding BCDC's jurisdiction over the Project, including the 100-foot BCDC jurisdictional band and the BCDC priority use areas identified in the Bay Plan. The Bay Plan identifies Hunters Point Shipyard (HPS) as a "Port priority" use area and Candlestick Point as "Waterfront Park" and "Beach" priority areas.

- **The Bay Trail Project** provided comments on the proposed extension of the Bay Trail. The Bay Trail Project is a nonprofit organization administered by the Association of Bay Area Governments and is responsible for implementation of the Bay Trail Plan. The comments addressed consistency of the proposed Bay Trail improvements with the Bay Trail Plan and the relationship of the trail with proposed transportation improvements.
- **City of Brisbane** provided comments regarding the characterization of the US-101/Geneva/Harney interchange and Geneva Avenue extension and analysis of the Project in relation to future transportation improvements necessary to serve the Project.
- **Literacy for Environmental Justice** provided comments regarding the cleanup of the Shipyard, and stated that such actions must be to residential standards.
- **Arc Ecology** provided comments regarding Project alternatives, social and economic impacts, and the level of environmental review that was proposed for the Project. Additional concerns focused on the content of the NOP.
- An **individual** resident in Bayview Hunters point provided comments regarding accessibility to the waterfront, aesthetics and neighborhood character of the waterfront area, and traffic.

PROJECT VARIANTS

Six variants of the Project were formulated by the Agency, the City, and Lennar Urban. These variants include the following:

- Variant 1: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—R&D Variant
- Variant 2: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—Housing Variant
- Variant 2A: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—Housing/R&D Variant
- Variant 3 (Tower Variants A, B, C, and D): Four Candlestick Point tower variants would have the same land use program and overall description as with the Project, but would have different locations and heights for residential towers at Candlestick Point
- Variant 4: A utilities variant would include an automated solid waste collection system, decentralized wastewater treatment, and district energy
- Variant 5: Shared stadium where both the San Francisco 49ers and Oakland Raiders would play at the stadium at HPS Phase II

Three variants (Variants 1, 2, and 2A) address the scenario of the San Francisco 49ers moving to the City of Santa Clara or elsewhere with no football stadium constructed at HPS Phase II. Each of those three variants includes a different land use program at the HPS Phase II site. Variant 1 (R&D Variant) would include increases in R&D space at the stadium location. Variant 2 (Housing Variant) would relocate 1,350 residential units from Candlestick Point to the stadium site. Variant 2A (Housing/R&D Variant) would relocate 1,650 housing units from Candlestick Point to the stadium site, and, in addition, includes an additional 500,000 sf of R&D compared to the Project (for a total of 3,000,000 sf of R&D); 500,000 sf of the total R&D for Variant 2A would be constructed on the stadium site along with the residential uses.

The Candlestick Point Tower Variant (Variant 3) would have the same land use program and overall description as the Project, but would have different locations, heights, and massing of residential towers at Candlestick Point (expressed as four options for this variant: Candlestick Point Tower Variant (Variant 3 [Tower Variants A, B, C, and D]).

A Utilities Variant (Variant 4) would include an automated solid waste collection system, decentralized wastewater treatment, and district energy. A 49ers/Raiders Shared Stadium Variant (Variant 5) would include the scenario of a shared stadium, where both the 49ers and Oakland Raiders would play at a new stadium at HPS Phase II.

None of the variants would alter the Project Objectives, which are provided in detail in Chapter II (Project Description) of this EIR. The variants are analyzed at a project level of detail, which is equal to the Project analysis included in Chapter III (Environmental Setting, Impacts, and Mitigation Measures), Section III.A through Section III.S of this EIR. The environmental impacts that would result from implementation of the variants are presented following the description of each variant. A comparison of the variant development programs to the Project is presented in Table ES-1a (Comparison of Variants to the Project). Table ES-1b (Impact Comparison of Project Variants) summarizes the effects of the Variants compared to the Project.

Table ES-1a Comparison of Variants to the Project

Differences	*Project*	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2: Housing Variant (No Stadium, Housing)*	*Variant 2A: Housing/ R&D Variant (No Stadium)*	*Variant 3: Candlestick Point Tower Variants (Different Tower Heights and Locations, Larger Floor Plates)*	*Variant 4: Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5: 49ers/Raiders Shared Stadium*
						Same overall development plan as Project, but with minor shifts in building locations to accommodate 570,000 gsf for the proposed utility systems (with 330,000 gsf located below ground).	Same development plan as Project
Land Use Plan							
Residential (units)—Candlestick Point	7,850	7,850	6,500	6,225[a]	7,850	7,850	7,850
Residential (units)—Hunters Point Phase II	2,650	2,650	4,000	4,275[a]	2,650	2,650	2,650
					Same number of residential units, but different placement of towers		
Office	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Research & Development (gsf)	2,500,000	5,000,000	2,500,000	3,000,000	2,500,000	2,500,000	2,500,000
Regional Retail	635,000	635,000	635,000	635,000	635,000	635,000	635,000
Neighborhood Retail	250,000	250,000	250,000	250,000	250,000	250,000	250,000
			Same overall amount of neighborhood retail as Project, but different distribution within HPS Phase II (refer to text for a description)	Same overall amount of neighborhood retail as Project, but different distribution within HPS Phase II (refer to text for a description]			
Tower Floor Plates	10,000 sf	10,000 sf	10,000 sf	10,000 sf	12,500 sf	N/A	N/A
Football Stadium (seats)	69,000 Stadium built by 2017	0	0	0	69,000 Stadium built by 2017	69,000 Stadium built by 2017	69,000 Shared stadium with 49ers and Oakland Raiders Stadium site built by 2017
Yosemite Slough Bridge	Auto/BRT/Ped	BRT/Ped	BRT/Ped	BRT/Ped	Auto/BRT/Ped	Auto/BRT/Ped	Auto/BRT/Ped
Parks, Open Space, and Recreation Uses							
Total Parks, Open Space, and Recreational Uses	336.4	327.0	349.4	326.6	336.4	336.4	337.5

Table ES-1a Comparison of Variants to the Project

Differences	*Project*	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2: Housing Variant (No Stadium, Housing)*	*Variant 2A: Housing/ R&D Variant (No Stadium)*	*Variant 3: Candlestick Point Tower Variants (Different Tower Heights and Locations, Larger Floor Plates)*	*Variant 4: Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5: 49ers/Raiders Shared Stadium*
New Parks	148.1	160.5	158	159	148.1	148.1	148.6
Sports Fields and Active Recreation	91.6	69.8	96.7	70.9	91.6	91.6	91.6
State Parklands (acres)	96.7	96.7	96.7	96.7	96.7	96.7	96.7

SOURCE: Lennar Urban, 2010.

a. The bridge would be open to automobiles only on game days.

Table ES-1b Impact Comparison of Project Variants to Project

		Impacts								
					Variant 3: Candlestick Point Tower Variants					
	Topic	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2: Housing Variant (No Stadium, Housing)*	*Variant 2A: Housing Variant with R&D (No Stadium)*	*Tower Variant A*	*Tower Variant B*	*Tower Variant C*	*Tower Variant D*	*Variant 4: Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5: 49ers/Raiders Shared Stadium*
III.B	Land Use and Plans	=	=	=	=	=	=	=	=	=
III.C	Population, Housing, and Employment	=	=	=	=	=	=	=	=	=
III.D	Transportation and Circulation	>	<	>	=	=	=	=	=	=
III.E	Aesthetics	=	<	<	>	>	>	>	=	=
III.F	Shadows	<	<	<	>	=	<	<	=	=
III.G	Wind	<	<	<	=	=	=	=	=	=
III.H	Air Quality	=	=	=	=	=	=	=	=	=
III.I	Noise	>	<	=	=	=	=	=	=	=
III.J	Cultural Resources and Paleontological Resources	=	=	=	=	=	=	=	=	=
III.K	Hazards and Hazardous Materials	=	=	=	=	=	=	=	=	=
III.L	Geology and Soils	=	=	=	=	=	=	=	=	=
III.M	Hydrology and Water Quality	>	<	=	=	=	=	=	<	=
III.N	Biological Resources	=	=	=	=	=	=	=	=	=
III.O	Public Services	>	<	=	=	=	=	=	=	=
III.P	Recreation	=	=	=	=	=	=	=	=	=
III.Q	Utilities	=	=	=	=	=	=	=	<	=
III.R	Energy	=	=	=	=	=	=	=	=	=
III.S	Greenhouse Gas Emissions	>	=	=	=	=	=	=	=	=

SOURCE: PBS&J,2010.

NOTE: Each topic is compared to the Project and for each impact area, impacts are equal to (=), greater than (>), or less than (<) the Project impacts.

ALTERNATIVES

A number of alternatives were analyzed that would avoid or substantially lessen some of the significant effects of the project. These alternatives, which are fully addressed in Chapter 6 (Alternatives) of this document, include the following:

- **Alternative 1: No Project**—Consistent with Section 15126.6(e)(1) of the CEQA Guidelines, this alternative assumes that no new development would occur at Candlestick Point and HPS Phase II would be developed with new uses consistent with the existing *Hunters Point Shipyard Redevelopment Plan* (HPS Redevelopment Plan).

  This alternative was selected in accordance with CEQA Guidelines Section 15126.6(e)(3)(A), which states that when the project is the revision of an existing land use or regulatory plan, policy, or ongoing operation, the "no project" alternative would be the continuation of the existing plan, policy, or operation into the future. This discussion would allow the decision-makers to compare the impacts of approving the Project with the impacts of not approving the Project.

- **Alternative 2: CP-HPS Phase II Development Plan; No Yosemite Slough Bridge**—Alternative 2 would have the same land use program proposed with the Project, including the State Parks agreement. Alternative 2 would not include the Yosemite Slough bridge. The main roadway connection between Candlestick Point and HPS Phase II would be via Ingalls Street. A bus rapid transit route would be constructed along an abandoned railroad right-of-way to provide access between Candlestick Point and HPS Phase II. This alternative assumes that the 49ers Stadium is relocated to HPS Phase II and the Agency enters into an agreement with CPSRA to reconfigure CPSRA land in the same way as for the Project.

  This alternative was selected to avoid impacts to biological resources associated with bridge construction and operation. Significant traffic, noise, and air quality impacts would not be reduced. This alternative would result in greater transportation-related impacts on game days because vehicular ingress and egress to and from the stadium would be delayed and traffic levels would be increased on local streets, including Innes Avenue, Evans Avenue, and Ingalls Street.

- **Alternative 3: Reduced CP-HPS Phase II Development; San Francisco 49ers Stay at Existing Candlestick Park Stadium; Limited State Parks Agreement; Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians**—Alternative 3 would be a reduced development alternative. Total housing with this alternative would be 5,210 units, about half of the units proposed with the Project. At Candlestick Point, residential development would be decreased and retail and arena uses would not be developed. Replacement of the Alice Griffith Public Housing site would occur and consist of 1,210 housing units. Minor improvements would be made to the CPSRA under the Limited State Parks Agreement. At HPS Phase II, housing would be increased; other uses at HPS Phase II would be similar to the Project. A new Yosemite Slough bridge serving only transit, bike and pedestrian traffic would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. This alternative assumes that the 49ers football team would continue to use the existing Candlestick Park stadium. At HPS Phase II, the alternative would not include a new 49ers Stadium.

  This alternative was selected to provide an alternative to the Project that reduces construction-related impacts generally and operational impacts associated with traffic, air quality, noise, demand for public services, biological resources, and other growth-related impacts. The development program of this alternative would be reduced compared to the Project and would generate fewer vehicle trips and reduce the area subject to development. This alternative would reduce traffic and noise impacts associated with an increase in vehicle trips and air quality impacts associated with Project

construction and operation. This alternative would reduce impacts to biological resources associated with bridge construction and operation as a result of the narrower bridge footprint and reduced bridge traffic. Construction and/or operational impacts related to the amount of development and the development footprint, such as soil erosion and stormwater runoff, as well as operational impacts related to population and employment growth, such as police and fire services, would also be reduced by this alternative.

- **Alternative 4: Reduced CP-HPS Phase II Development; Historic Preservation; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge**—Alternative 4 would also be a reduced development alternative. Total housing with this alternative would be 7,350 units, about 30 percent less than proposed with the Project. The proposed floor areas for most uses would be approximately 30 percent smaller at full build-out in comparison to build-out of the Project. No improvements would be made in the CPSRA. This alternative includes preservation of five potentially historic structures at HPS Phase II. This alternative does not include construction of a bridge over Yosemite Slough.

  This alternative was selected to include historic preservation of the five eligible structures on HPS and to provide a reduced development alternative to the Project. This alternative would reduce the area subject to development and would avoid significant impacts to historic resources at HPS Phase II. Reduced development would result in fewer vehicle trips. This alternative would reduce traffic and noise impacts associated with the increase in vehicle trips and air quality impacts associated with Project operation and construction. This alternative would also avoid impacts to biological resources associated with bridge construction and operation. Construction and/or operational impacts related to the amount of development and the development footprint, such as soil erosion and stormwater runoff, as well as operational impacts related to population and employment growth, such as police and fire services, would also be reduced by this alternative.

  - **Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation**—This subalternative to Alternative 4 retains all of the historic buildings, but includes the same land use plan as described for the Project rather than a reduced development plan as under Alternative 4. This subalternative would preserve the same five historically eligible structures (Buildings 208, 211, 224, 231, and 253) as Alternative 4. The Project's land use plan would be implemented under this subalternative in terms of total square footage of land uses and district locations. However, unlike the Project, Buildings 211, 224, 231, and 253 would be retained and not demolished. The displaced R&D that, under the Project, would be built at the location of Buildings 211, 224, 231, and 253 would be distributed throughout the remainder of the HPS Phase II development and total floor area for R&D would remain the same as the Project, at 2,500,000 sf. However, the building heights in the R&D District on HPS Phase II would increase to accommodate the displaced square footage. Buildings 211, 231, and 253 would be rehabilitated under the Secretary of Interior's Standards to accommodate approximately 338,000 gsf of R&D and 1,000 parking spaces. Building 224, the air raid shelter, would be rehabilitated to provide museum space. Subalternative 4A would also retain existing grades, allowing railroad spurs and other historic elements to remain. A wave protection berm is proposed to accommodate a 36-inch sea level rise. The Bay Trail would run on top of the berm, which would be designed to include seat steps. All other components of Subalternative 4A would remain the same as under the Project.

- **Alternative 5: Reduced CP-HPS Phase II Development; No HPS Phase II Stadium, State Parks Agreement, or Yosemite Slough Bridge**—Alternative 5 would have the same land use program proposed with the Project, except that the new stadium at HPS Phase II and the Yosemite Slough bridge would not be constructed. The total number of housing units would be the same as for the Project; however, because this alternative would not include the CPSRA boundary

reconfiguration, the land area available for development would be smaller. Approximately 1,350 units would be shifted from Candlestick Point to HPS Phase II. This alternative assumes a State Parks agreement does not occur and there is no agreement with the 49ers for a stadium at the Project site.

This alternative was selected to reduce construction impacts generally and to avoid impacts to biological resources associated with bridge construction and operation. Significant traffic, noise, and air quality impacts would not be reduced. Construction impacts that relate to the size of the development footprint would also be reduced by this alternative.

Other alternatives were considered, but eliminated from further analysis in this EIR, including:

- Alternative San Francisco 49ers stadium locations (City of Brisbane or Port of San Francisco sites)
- Alternative land use plans and locations for the 49ers Stadium on HPS Phase II
- Alternative land use plan for Candlestick Point
- Develop Candlestick Point for parks and open space only
- Alternative locations for the Project within the City of San Francisco
- Alternative locations for the Project outside the City of San Francisco

Table ES-1c (Summary of Project Alternatives) provides an overview of how the land uses of the Alternatives compare to the land uses of the Project. Table ES-1d (Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives) provides a summary comparison of the significant and unavoidable impacts of the Project compared to each of the Alternatives.

Table ES-1c Summary of Project Alternatives

Use	*Project*	*Alternative 1 No Project*[a]	*Alternative 2 No Bridge Alt*	*Alternative 3 49ers at Candlestick*	*Alternative 4 Lesser Build with Historic Preservation*	*Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation*	*Alternative 5 No Park Agreement*
Candlestick Point							
Residential (units)	7,850	0	7,850	1,210	5,495	7,850	6,500
Retail (gsf):							
Regional Retail	635,000	0	635,000	0	444,500	635,000	635,000
Neighborhood Retail	125,000	0	125,000	0	87,500	125,000	125,000
Retail Subtotal (gsf)	*760,000*	*0*	*760,000*	*0*	*532,000*	*760,000*	*760,000*
Community Services (gsf)	50,000	0	50,000	0	50,000	50,000	50,000
Hotel (gsf)[a]	150,000	0	150,000	0	105,000	150,000	150,000
Office (gsf)	150,000	0	150,000	0	105,000	150,000	150,000
10,000-seat Arena (gsf)	75,000	0	75,000	0	75,000	75,000	75,000
Football Stadium (seats)	0	70,000	0	70,000	0	0	70,000
HPS Phase II							
Residential (units)	2,650	1,800[b]	2,650	4,000	1,855	2,650	4,000

Table ES-1c Summary of Project Alternatives

Use	*Project*	*Alternative 1 No Project*[a]	*Alternative 2 No Bridge Alt*	*Alternative 3 49ers at Candlestick*	*Alternative 4 Lesser Build with Historic Preservation*	*Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation*	*Alternative 5 No Park Agreement*
Neighborhood Retail (gsf)	125,000	570,000	125,000	125,000	87,500	125,000	125,000
Research & Development (gsf)	2,500,000	1,087,000	2,500,000	2,500,000	1,750,000	2,500,000	2,500,000
Artists' Studios (gsf):							
1:1 Studio Renovation and Replacement (gsf)[c]	225,000	225,000	225,000	225,000	225,000	225,000	225,000
New Artist Center (gsf)	30,000	0	30,000	30,000	30,000	30,000	30,000
Artist Studio Subtotal (gsf)	*255,000*	*225,000*	*255,000*	*255,000*	*255,000*	*255,000*	*255,000*
Community Services (gsf)	50,000	0	50,000	50,000	50,000	50,000	50,000
Football Stadium (seats)	69,000	0	69,000	0	0	69,000	0
Mixed-Use	0	580,000	0	0	0	0	0
Cultural and Education	0	330,600	0	0	0	0	0
Marina (slips)	300	0	300	300	0	300	300
Other Elements							
Yosemite Slough bridge	Bridge	No bridge	No bridge	BRT/Pedestrian bridge	No bridge	Bridge	No bridge
Shoreline Improvements	Yes	No	Yes	Yes	Yes	Yes	Yes
State Parks Agreement/ total acres of State Parkland	Yes/96.7	No/120.2	Yes/96.7	Yes/117.2[d]	Yes/96.7	Yes/96.7	No/120.2

SOURCE: Lennar Urban, PBS&J, 2009.

a. Hotel uses include 220 rooms at the proposed Regional Retail Center.
b. 1,800 housing units on the entire Shipyard including the Phase I site.
c. Existing artist studios would be replaced at a one-to-one ratio under all alternatives.
d. Limited exchange of 3.03 acres to construct BRT/pedestrian only Yosemite Slough bridge and Alice Griffith Public Housing

Table ES-1d Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
Impact TR-1 The Project would result in construction-related transportation impacts in the Project vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Project vicinity. Mitigation measure MM TR-1 would reduce but not avoid construction-related transportation impacts during construction activities. Therefore, construction transportation impacts would remain significant.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-2 Implementation of the Project would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts. Although implementation of a Travel Demand Management Plan was assumed in developing Project travel demand estimates, and would be essential to ensure that impacts at additional locations do not occur, traffic congestion caused by the Project and the Project's contribution to cumulative impacts would still be significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-3 The Project would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Project vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-4 At the intersection of Tunnel/Blanken, the Project would result in significant Project AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-5 Project contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-6 Project contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table ES-1d Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-8 Project contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-10 The Project would result in significant Project traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-11 The Project would contribute to significant cumulative traffic impacts at four freeway segments. No feasible mitigation is available.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-12 The Project would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-13 The Project would contribute to significant cumulative traffic impacts at 12 freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-14 The Project would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-15 The Project would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table ES-1d Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives					
	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-21 The Project would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Project impacts and Project contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-22 The Project would increase congestion and contribute to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Implementation of mitigation measure MM TR-22.1 and MM TR-22.2 would reduce impacts to transit operations. However, since feasibility of MM TR-22.1 is uncertain, and since MM TR-22.2, without MM TR-22A, would reduce, but not completely avoid, impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy, Project impacts and Project contributions to cumulative impacts on the these lines would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-23 The Project would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Project impacts and Project contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-24 The Project would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Project impacts and Project contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-25 The Project would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table ES-1d Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-26 The Project would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Project impacts and Project contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-27 The Project would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Project impacts and Project contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-28 The Project would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101. No feasible mitigation has been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-30 The Project would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-32 The Project's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-38 For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI

Table ES-1d Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-39 The existing game day service and Project transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Impact TR-46 Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Impact TR-47 The existing transit service and Project improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Impact TR-51 Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Project conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Project	<	=	<	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Impact TR-52 Sell-out weekday evening events at the arena could impact existing and proposed transit service. However, traffic congestion would impact transit operations. Implementation of mitigation measure MM TR-23.1 would reduce impacts to less than significant. Due to the uncertainty of this mitigation the impact would remain significant.					
Significance of Alternative Compared to Project	<	=	<	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
AIR QUALITY					
Impact AQ-4 Operation of the Project would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out in the year 2029.					
Significance of Alternative Compared to Project	<	=	<	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU

Table ES-1d Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
NOISE					
Impact NO-2 Construction activities associated with the Project would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact NO-3 Construction activities associated with the Project would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact NO-6 Operation of the Project would generate increased local traffic volumes that could cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact NO-7 Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
CULTURAL RESOURCES					
Impact CP-1 Construction activities associated with the Project could result in a substantial adverse change in the significance of a historical resource.					
Significance of Alternative Compared to Project	=	=	=	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/LTS	SU/SU

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

SUMMARY OF IMPACTS

Table ES-2, which is provided below, summarizes the (1) potential environmental impacts that would occur as a result of the proposed project, provided in the form of an "impact statement"; (2) the level of significance of the environmental impact prior to implementation of any applicable mitigation measures; (3) the recommended mitigation measures that avoid or reduce significant environmental impacts; and (4) the level of significance after mitigation measures are implemented.

There are generally two ways that the impact analysis is structured and then presented in Table ES-2. In most cases, there are three impact statements, with the first one reflecting the combined impact of Candlestick Point and HPS Phase II (i.e., Impact XX-#, such as Impact PH-2); the second addressing the impact at Candlestick Point (i.e., Impact XX-#a, such as Impact PH-2a); and the third addressing the impact at HPS Phase II (i.e., Impact XX-#b, such as Impact PH-2b). Where impacts could occur as a result of construction of the Yosemite Slough bridge, the marina, or the shoreline improvements, those impacts are usually discussed separately, resulting in four or more impact discussions, which would be numbered Impact PH-2c, Impact PH-2d, and Impact PH-2e, using the numbering sequence of the preceding example. In these cases, the impacts are still summarized with a combined impact of the Project. In some instances, the analyses for Candlestick Point and Hunters Point Shipyard Phase II are similar, and, therefore, are discussed together as the Project (i.e., Impact XX-#, such as Impact LU-2); in these cases, the analysis is not differentiated by area. One exception to this general format is in Section III.N (Biological Resources), where Project impacts are presented after the discussion of individual impacts at Candlestick Point and HPS Phase II. Project impacts begin with Impact BI-22 and conclude with Impact BI-26.

The impact statements provided in Table ES-2 (in the first column) reflect whether the impact is caused by construction of the Project; implementation of the Project (meaning the conditions that would exist after the Project were constructed, which is generally related to the development pattern); or operation of the Project (reflecting conditions that would exist during actual operational activities, such as additional motor vehicle trips resulting from uses at the Project site). In a few instances, the impact statement is factual, such as "The Project would conform to the current regional air quality plan." In all cases, the impact statement reflects the condition that would result after the implementation of all of the identified mitigation measures.

The Draft EIR uses the following terms to describe the level of significance of impacts identified during the course of the environmental analysis:

- **Significant Impact (S)**—A "significant effect" is defined by Section 15382 of the CEQA Guidelines as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment … [but] may be considered in determining whether the physical change is significant." As defined in this EIR, a significant impact exceeds the defined significance criteria and will result in significant and unavoidable impacts, either with or without feasible mitigation. If there are no feasible mitigation measures to reduce the impact, including compliance with existing local, State, and federal laws and regulations, it is considered significant and unavoidable (SU) at the conclusion of the analysis. If there are feasible mitigation measures to reduce the impact, including compliance with existing local, State, and federal laws and

regulations, it is considered significant and unavoidable with mitigation (SU/M) at the conclusion of the analysis

- **Potentially Significant Impact (PS)**—Impact that could exceed the defined significance criteria, but can be eliminated or reduced to a less-than-significant level through implementation of the identified mitigation measures.
- **Less-Than-Significant Impact (LTS)**—Impact that does not exceed the defined significance criteria or would be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations.
- **No Impact (NI)**—No adverse changes (or impacts) to the environment are expected.
- **Significant and Unavoidable Impact (SU)**—Impact that exceeds the defined significance criteria and cannot be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations and/or implementation of all feasible mitigation measures.
- **Significant and Unavoidable Impact with Mitigation (SU/M)**— Impact that exceeds the defined significance criteria and can be reduced through compliance with existing local, State, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.
- **Less-Than-Significant Impact with Mitigation (LTS/M)**—Impact that is reduced to a less-than-significant level through implementation of the identified mitigation measures.

Project impacts are assessed in light of existing regulatory requirements that would serve to mitigate potential impacts. The effectiveness of existing regulations to mitigate potential impacts is often affected by discretionary requirements, site characteristics, and project features and design-level considerations that are not yet detailed. Because there is some discretion in how these regulations can be applied, for some impacts, these requirements are included as mitigation measures to outline the specific process by which the Project will comply with these regulations.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
SECTION III.B(LAND USE AND PLANS)			
Impact LU-1 Implementation of the Project would not physically divide an established community.	**NI**	No mitigation is required.	**NI**
Impact LU-2 Implementation of the Project would not conflict with land use plans, policies, or regulations adopted to avoid or mitigate an environmental effect.	**LTS**	No mitigation is required.	**LTS**
Impact LU-3 Implementation of the Project would not have a substantial adverse impact on the existing character of the vicinity.	**LTS**	No mitigation is required.	**LTS**
SECTION III.C (POPULATION, HOUSING, AND EMPLOYMENT)			
Impact PH-1 Construction of the Project would not induce substantial direct population growth.	**LTS**	No mitigation is required.	**LTS**
Impact PH-2 Operation of the Project would not induce substantial direct or indirect population growth.	**LTS**	No mitigation is required.	**LTS**
Impact PH-2a Operation of Candlestick Point would not induce substantial direct or indirect population growth.	**LTS**	No mitigation is required.	**LTS**
Impact PH-2b Operation of HPS Phase II would not induce substantial direct or indirect population growth.	**LTS**	No mitigation is required.	**LTS**
Impact PH-3 The Project would not displace existing housing units or residents, necessitating the construction of new units elsewhere.	**NI**	No mitigation is required.	**NI**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact PH-3a Implementation of the Project would not displace existing housing units and residents at Candlestick Point, necessitating the construction of new units elsewhere.	**NI**	No mitigation is required.	**NI**
Impact PH-3b Implementation of the Project would not displace existing housing units or residents at HPS Phase II, necessitating the construction of new units elsewhere.	**NI**	No mitigation is required.	**NI**
		SECTION III.D (TRANSPORTATION AND CIRCULATION)	
Impact TR-1 Construction of the Project would result in transportation impacts in the Project vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Project vicinity.	**PS**	**MM TR-1** Candlestick Point–Hunters Point Shipyard Phase II Construction Traffic Management Program. The Project Applicant shall develop and implement a Candlestick Point–Hunters Point Shipyard Phase II Construction Traffic Management Program to minimize impacts of the Project and its contribution to cumulative impacts related to construction activities and construction traffic. The program shall provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. The program shall supplement and expand, rather than modify or supersede any manual, regulations, or provisions set forth by SFMTA, DPW or other City departments and agencies. Preparation of the Construction Management Program shall be the responsibility of the Project Applicant, and shall be reviewed and approved by SFMTA and DPW prior to initiation of construction. The Project Applicant shall update the program prior to approval of development plans for Phase 2, Phase 3, and Phase 4 of construction to reflect any change to Project development schedule, reflect transportation network changes, to update status of other development construction activities, and to reflect any changes to City requirements. The program shall: ■ Identify construction traffic management practices in San Francisco, as well as other jurisdictions that although not being implemented in the City could provide useful guidance for a project of this size and characteristics. ■ Describe procedures required by different departments and/or agencies in the City for implementation of a construction management plan, such as reviewing agencies, approval process, and estimated timelines. ■ Describe coordination efforts associated with the Navy remediation efforts and scheduling regarding construction vehicle routing via the Crisp gate.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Identify construction traffic management strategies and other elements for the Project, and present a cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the Bayview Hunters Point area. These could include construction strategies, demand management strategies, alternate route strategies, and public information strategies. ■ Coordinate with other projects in construction in the immediate vicinity, so that they can take an integrated approach to construction-related traffic impacts. ■ Present guidelines for selection of construction traffic management strategies.	
Impact TR-2 Implementation of the Project would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, even with implementation of a Travel Demand Management Plan.	**PS**	**MM TR-2** TDM Plan. The Project Applicant shall prepare and implement a final TDM plan, which shall include the following elements: ■ Visitor Variable, Market-Rate Parking Pricing ■ Maximum Permitted Parking Ratios ■ Flexible Parking Management Strategies ■ Unbundled Residential Parking ■ Transit Strategies and Support Strategies ■ Central Transit Hub ■ Enhanced Transit Service and Bicycle Facilities ■ Bicycle Support Facilities ■ Wayfinding Signs ■ EcoPass for Residents ■ Carshare Services ■ Employee TDM Programs > Information Boards/Kiosks > In-building Real-Time transit monitors with sightlines of transit hubs > Commuter Benefits > Employee EcoPass > Carpool/Vanpools > Guaranteed Ride Home Program > Compressed Work Weeks, Flex Time, and Telecommuting ■ CP-HPS Transportation Management Association ■ On-site Transportation Coordinator and Website ■ Targeted Marketing	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Monitoring of Transportation Demand ■ Monitoring Effectiveness of Congestion-Reducing and Traffic-Calming Efforts The final TDM plan shall be approved as part of the Disposition and Development Agreement (DDA).	
Impact TR-3 Implementation of the Project would contribute traffic to significant cumulative impacts at intersections in the Project vicinity.	**PS**	No feasible mitigation is identified.	**SU**
Impact TR-4 At the intersection of Tunnel/Blanken, implementation of the Project would result in significant Project AM peak hour traffic impacts, and would contribute to cumulative PM peak hour traffic impacts.	**PS**	**MM TR-4** Restripe the northbound and southbound approaches of the intersection of Tunnel/Blanken to provide dedicated left-turn lanes adjacent to shared through/right-turn lanes. The restriping would require prohibition of parking for 160 feet in the southbound approach (loss of eight parking spaces) and for 100 feet in the northbound approach (loss of five parking spaces). Implementation of the intersection restriping shall be the responsibility of SFMTA, and shall be implemented when intersection improvements associated with the Visitacion Valley Redevelopment Plan (i.e., signalization) are no longer sufficient to maintain acceptable intersection level of service conditions.	**SU/MM**
Impact TR-5 Implementation of the Project would contribute traffic at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions.	**PS**	No feasible mitigation is identified.	**SU**
Impact TR-6 Implementation of the Project could contribute traffic at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions.	**PS**	**MM TR-6** Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts. The City of Brisbane and Caltrans, as part of the Harney Interchange Project, shall account for existing traffic, background traffic growth, and the most recent forecasts of traffic expected to be associated with each of several adjacent development projects, including the Project. The San Francisco County Transportation Authority (SFCTA) shall coordinate with the City of Brisbane and Caltrans to ensure Project-generated vehicle trips are accounted for in the Harney Interchange analyses and design. Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts, including freeway segment impacts, shall be formulated through the current interjurisdictional Bi-County Transportation Study effort being led by the SFCTA or its equivalent. The Project Applicant shall contribute its fair share to the Harney Interchange Project.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-7 Implementation of the Project could contribute traffic to the intersections of Amador/Cargo/Illinois, which would operate at LOS E under 2030 No Project.	**PS**	**MM TR-7** Feasibility study of reconfiguring the southbound approach on Illinois Street to provide a dedicated southbound left turn lane and a dedicated right-turn lane. SFMTA shall conduct a feasibility study with the Port of San Francisco to determine the feasibility of reconfiguring the southbound approach on Illinois Street to provide a dedicated southbound left turn lane and a dedicated right-turn lane. Sufficient right-of-way is available to implement this improvement; however, provision of two southbound lanes would require narrowing a portion of the island to the west of the southbound approach to Cargo Way. Implementation of the intersection improvements shall be the responsibility of SFMTA and the Port of San Francisco, and shall be implemented when traffic operating conditions with the existing intersection configuration worsens to unacceptable levels. If determined feasible, the Project Applicant shall contribute its fair share to the intersection improvements.	**SU/MM**
Impact TR-8 Implementation of the Project could contribute traffic to the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project.	**PS**	**MM TR-8** Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts. The City of Brisbane, as part of the Geneva Avenue Extension Project, shall account for existing traffic, background traffic growth, and the most recent forecasts of traffic expected to be associated with each of several adjacent development projects, including the Project. The San Francisco County Transportation Authority (SFCTA) and SFMTA shall coordinate with the City of Brisbane to ensure projected traffic volumes are accounted for in the design of the Geneva Avenue Extension. Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts, including freeway segment impacts, shall be formulated through the current interjurisdictional Bi-County Transportation Study effort being led by the SFCTA or its equivalent. The Project Applicant shall contribute its fair share to the Geneva Avenue Extension Project.	**SU/MM**
Impact TR-9 Implementation of the Project would have less-than-significant Project and cumulative impacts at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions.	**LTS**		**LTS**
Impact TR-10 Implementation of the Project would result in significant Project traffic spillover impacts and contribute to cumulative traffic spillover impacts.	**PS**	MM TR-2 and MM TR-17 would apply to this impact.	**SU/MM**
Impact TR-11 Implementation of the Project would contribute to significant cumulative traffic impacts at four freeway segments.	**PS**	No feasible mitigation is identified.	**SU**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-12 Implementation of the Project would result in significant impacts at four freeway on-ramp locations.	**PS**	No feasible mitigation is identified.	**SU**
Impact TR-13 Implementation of the Project would contribute to significant cumulative traffic impacts at 12 freeway ramp locations.	**PS**	No feasible mitigation is identified.	**SU**
Impact TR-14 Implementation of the Project could result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp.	**PS**	MM TR-6 would apply to this impact.	**SU/MM**
Impact TR-15 Implementation of the Project could contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations (US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue).	**PS**	MM TR-6 would apply to this impact.	**SU/MM**
Impact TR-16 Implementation of the Project would increase traffic volumes and would not make a considerable contribution to cumulative traffic volumes on Harney Way.	**PS**	**MM TR-16** Widen Harney Way as shown in Figure 5 in the Transportation Study. Prior to issuance of the grading permit for Development Phase 2 of the Project, the Project Applicant shall widen Harney Way as shown in Figure 5 in the Transportation Study. Prior to the issuance of grading permits for Phases 2, 3 and 4, the Project Applicant shall fund a study to evaluate traffic conditions on Harney Way and determine whether additional traffic associated with the next phase of development would result in the need to modify Harney Way to its ultimate configuration, as shown in Figure 6 in the Transportation Study, unless this ultimate configuration has already been built. This study shall be conducted in collaboration with the SFMTA, which would be responsible for making final determinations regarding the ultimate configuration. The ultimate configuration would be linked to intersection performance, and it would be required when study results indicate intersection LOS at one or more of the three signalized intersection on Harney Way at mid-LOS D (i.e., at an average delay per vehicle of more than 45 seconds per vehicle). If the study and SFMTA conclude that reconfiguration would be necessary to accommodate traffic demands associated with the next phase of development, the Project Applicant shall be responsible to fund and complete construction of the improvements prior to occupancy of the next phase.	**LTS/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-17 Implementation of the Project would not exceed available transit capacity, because the Project and the Project's contribution to cumulative demand would be accommodated within the existing transit service, proposed TEP service, plus the service proposed as part of the Project.	**PS**	**MM TR-17** Implement the Project's Transit Operating Plan. The Project Applicant shall work with SFMTA to develop and implement the Project's Transit Operating Plan. Elements of the Project Transit Operating Plan shall include: ■ Extension of the 24-Divisadero, the 44-O'Shaughnessy, and the 48-Quintara-24th Street into Hunters Point Shipyard. ■ Increased frequency on the 24-Divisadero to 6 minutes in the AM and PM peak periods. Extension of the 29-Sunset from its current terminus near the Alice Griffith housing development, near Gilman Avenue and Giants Drive, into the proposed Candlestick Point retail area. The 29-Sunset would operate a short line between Candlestick Point and the Balboa Park BART station. This would increase frequencies on the 29-Sunset by reducing headways between buses from 10 minutes to 5 minutes during the AM and PM peak periods between Candlestick Point and the Balboa BART station. Every other bus would continue to serve the Sunset District (to the proposed terminus at Lincoln Drive and Pershing Drive in the Presidio) at 10-minute headways. ■ Convert T-Third service between Bayview and Chinatown via the Central Subway from one-car to two-car trains or comparable service improvement. Extension of the 28L-19th Avenue Limited from its TEP-proposed terminus on Geneva Avenue, just east of Mission Street, into the Hunters Point Shipyard transit center. The 28L-19th Avenue Limited would travel along Geneva Avenue across US-101 via the proposed Geneva Avenue extension and new interchange with US-101, to Harney Way. East of Bayshore Boulevard, the 28L-19th Avenue Limited would operate as BRT, traveling in exclusive bus lanes into the Candlestick Point area. The BRT route would travel through the Candlestick Point retail corridor, and cross over Yosemite Slough into the Hunters Point Shipyard transit center. ■ The 28L-19th Avenue Limited would operate a short line to the Balboa Park BART station. This would increase frequencies on the 28L-19th Avenue Limited by reducing headways between buses from 10 minutes to 5 minutes for the segment between Hunters Point Shipyard and the Balboa Park BART station. Every other bus would continue to the Sunset District (to the proposed terminus at North Point Street and Van Ness Avenue) at 10-minute headways. If the TEP-proposed extension of the 28L has not been implemented by the SFMTA by the time implementation of this measure is called for in the Transportation Study (Appendix D), the Project Applicant shall fund the extension of that line between its existing terminus and Bayshore Boulevard. ■ New CPX-Candlestick Express to downtown serving the Candlestick Point site, traveling along Harney Way (with potential stops at Executive Park), before traveling on US-101 toward downtown, terminating at the Transbay Terminal. ■ New HPX-Hunters Point Shipyard Express to downtown serving the Hunters Point Shipyard site, traveling from the Hunters Point Shipyard Transit Center, along Innes Avenue, with stops at the India Basin and Hunters View areas, before continuing along Evans Avenue to Third Street, eventually entering I-280 northbound at 25th/Indiana. The HPX would continue non-stop to the Transbay Terminal in Downtown San Francisco.	**LTS/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-18 With full implementation of the Project with proposed transit improvements, the Project demand and the Project's contribution to cumulative demand would not exceed the proposed transit system's capacity at the study area cordons.	**PS**	MM TR-17 would apply to this impact.	**LTS/MM**
Impact TR-19 Implementation of the Project would add transit trips and the Project's contribution to cumulative transit trips to the Downtown Screenlines would not increase demands in excess of available capacity.	**LTS**	No mitigation is required.	**LTS**
Impact TR-20 Implementation of the Project would add transit trips and the Project's contribution to cumulative transit trips would not contribute significantly to Regional Screenlines conditions where overall ridership is projected to exceed available capacity.	**LTS**	No mitigation is required.	**LTS**
● **Impact TR-21** Implementation of the Project could increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno.	**PS**	**MM TR-21.1** Maintain the proposed headways of the 9-San Bruno. To address Project impacts to the 9-San Bruno, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the San Bruno Avenue corridor, generally between Campbell Avenue and Silver Avenue. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 9-San Bruno. ■ Install a transit-only lane on northbound San Bruno Avenue for the one-block section (400 feet) between Silliman Street and Silver Avenue. This would involve removal of five metered spaces on the east side of San Bruno Avenue, just south of Silver Avenue. Treatment for transit-only lanes can range from striping to physical elevation changes or barriers to protect transit right-of-way from mixed-flow traffic. ■ Install a transit-only lane on southbound San Bruno Avenue at the approach to Dwight Street/Paul Avenue. This lane would function as a so-called "queue-jump" lane, allowing buses to bypass queues on southbound San Bruno Avenue at the intersection. The lane should begin approximately 200 feet north of Dwight Street and extend one block (about 300 feet) south of Paul Avenue to Olmstead Street. This would involve the removal of up to 20	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		on-street parking spaces on the west side of San Bruno Avenue. This treatment could be limited to peak hours only, which would minimize the impact of the parking loss. The segment of San Bruno Avenue between Dwight Street and Olmstead Street is designated as Bicycle Routes #705 and 5 (Class III signed routes). ■ At the intersection of San Bruno/Silver install signal priority treatments on westbound Silver Avenue, where buses waiting to turn left from Silver Avenue onto southbound San Bruno Avenue must currently wait through almost an entire signal cycle due to the heavy oncoming traffic on eastbound Silver Avenue. Installation of a transit signal pre-emption at this location that provides a "green" signal for westbound vehicles but holds eastbound vehicles when buses are present would allow transit vehicles to turn left onto San Bruno Avenue without having to wait for opposing eastbound through traffic to clear. The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include comprehensive replacement of stop-controlled intersections with interconnected traffic signals equipped with transit priority elements. **MM TR-21.2** Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 9-San Bruno. Should mitigation measure MM TR-21.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 9-San Bruno. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.	
● **Impact TR-22** Implementation of the Project would contribute traffic to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy.	**PS**	**MM TR-22.1** Maintain the proposed headways of the 23-Monterey, 24-Divisidero and the 44-O'Shaughnessy. To address Project impacts to the 23-Monterey, 24-Divisidero and the 44-O'Shaughnessy, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the Palou Avenue corridor, generally between Griffith Street and Newhall Street. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 23-Monterey, 24-Divisidero and the 44-O'Shaughnessy. ■ Convert one of the two westbound travel lanes on Palou Avenue between Keith Street and Newhall Street (three blocks) to a transit-only lane at all times. Treatment for transit-only lanes can range from striping to physical elevation changes to protect right-of-way from mixed-flow traffic. Because the westbound lanes between Third Street and Newhall Street are relatively narrow, parking would likely need to be prohibited on the north side of Palou Avenue between Third Street and Newhall Street (approximately 600 feet) during peak periods to maximize the effectiveness of the transit-only lane. ■ Convert one of the two eastbound travel lanes on Palou Avenue between Newhall Street and Third Street (one block) to a transit-only lane at all times. Because the eastbound travel lanes between Newhall Street are relatively narrow, parking would likely need to be prohibited on the south side of Palou Avenue between	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

Newhall Street and Third Street (approximately 600 feet) during peak periods to maximize the effectiveness of the transit-only lane. In the eastbound direction, east of Third Street, buses would re-enter the single mixed-flow traffic lane at the bus stop on the far (east) side of Third Street.

- There are currently pedestrian corner bulbs on the northwest and southwest corners of the intersection of Palou Avenue and Third Street. In order to accommodate the transit-only lanes west of Third Street, these bulbouts would be reconfigured or removed. Although removing pedestrian bulb-outs may increase pedestrian crossing distances and is generally inconsistent with the City's desire to prioritize pedestrian activity, in this case, the improvement would offer substantial benefits to transit travel times by allowing a transit-only lane through a congested intersection. This would be consistent with the City's transit-first policy.
- During the PM peak period only, prohibit parking on westbound Palou Avenue for the four-block segment between Griffith Street/Crisp Avenue and Keith Street, to provide for a PM peak period curb transit-only lane along this segment. This would create a continuous westbound transit-only lane on Palou Avenue between Griffith Street/Crisp Avenue and Newhall Street during the PM peak period.
- As an alternative to the bulleted measures above, narrow the existing sidewalks on Palou Avenue from Third Street to Crisp Avenue (seven blocks) from 15 feet to 12 feet in width. The pedestrian bulb-outs on the west side of Third Street would be removed. The resulting 12-foot-wide sidewalks would be consistent with the Better Streets Plan guidelines. The reduction in sidewalk width would allow for the provision of a 7-foot-wide on-street parking lane, an 11-foot-wide transit-only lane, and a 10-foot-wide mixed-flow lane in each direction on Palou Avenue. This would preserve on-street parking along the corridor and provide a seven-block transit-only lane on Palou Avenue between Griffith Street/Crisp Avenue and Newhall Street. Treatment for transit-only lanes can range from striping to physical elevation changes to protect right-of-way from mixed-flow traffic. Subsequent to publication of the Draft EIR, SFMTA and the Project Applicant conducted an evaluation of this alternative measure and determined that it is a feasible and viable alternative to the four bulleted items above.

The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include signal priority treatments at other signalized intersections including at Bayshore/Cortland, Bayshore/Industrial, and Bayshore/Oakdale.

MM TR-22.2 Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 23-Monterey, the 24-Divisadero and the 44-O'Shaughnessy. Should mitigation measure MM TR-22.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 23-Monterey, the 24-Divisadero and the 44-O'Shaughnessy. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-23 Implementation of the Project would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset.	**PS**	**MM TR-23.1** Maintain the proposed headways of the 29-Sunset. To address Project impacts to the 29-Sunset, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the Gilman Avenue and Paul Avenue corridor, generally between Arelious Walker Drive and Bayshore Boulevard. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 29-Sunset. ■ For the five-block segment of Gilman Avenue between Arelious Walker Drive and Third Street, prohibit on-street parking on westbound Gilman Avenue during the AM and PM peak periods to provide for three westbound travel lanes. During the peak periods convert one of the three westbound travel lanes to transit-only. During off-peak periods, parking would be allowed, and buses would travel in one of the two mixed-flow lanes. The peak period transit lanes would impact 90 parking spaces. ■ For the same five-block segment of Gilman Avenue between Arelious Walker Drive and Third Street, restripe the eastbound direction to provide two travel lanes, one of which would accommodate on-street parking and one of which would be a mixed-flow travel lane. During the AM and PM peak periods, prohibit on-street parking in the eastbound direction, and operate one of the two eastbound lanes as transit-only lanes. The peak period transit lanes would impact 80 parking spaces. ■ As an alternative to the two bulleted measures above, convert one of the travel lanes in each direction on Gilman Avenue from Third Street to Griffith Street to transit-only. This would allow for the provision of a 7-foot-wide on-street parking lane, an 11-foot-wide transit-only lane, and a 10-foot-wide mixed-flow lane in each direction on Gilman Avenue. This would preserve on-street parking along the corridor and provide four-block transit-only lanes on Gilman Avenue between Griffith Street and Third Street. Treatment for transit-only lanes can range from striping to physical elevation changes to protect right-of-way from mixed-flow traffic. Subsequent to publication of the Draft EIR, SFMTA and the Project Applicant conducted an evaluation of this alternative measure and determined that is a feasible and viable alternative to the two bulleted items above, ■ Prohibit on-street parking on the north side of Paul Avenue, between Third Street and Bayshore Boulevard to create two westbound through lanes. Convert one westbound through lane to transit-only in the AM and PM peak periods. The peak period transit-only lane would impact 40 parking spaces. At the intersection of Paul Avenue and Bayshore Avenue, provide transit signal priority treatment (i.e., queue jump) to allow transit vehicles to maneuver into the mixed flow left-hand lane, facilitating a left-turn movement immediately west of Bayshore Boulevard from westbound Paul Avenue to southbound San Bruno. The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include transit priority treatments on San Bruno Avenue, on the portions where the 29-Sunset travels.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		MM TR-23.2 Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 29-Sunset. Should mitigation measure MM TR-23.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 29-Sunset. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.	
Impact TR-24 Implementation of the Project would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street.	**PS**	**MM TR-24.1** Maintain the proposed headways of the 48-Quintara-24th Street. To address Project impacts to the 48-Quintara-24th Street, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the Evans Avenue corridor, generally between Hunters Point Boulevard and Napoleon Street. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 48-Quintara-24th Street. ■ On Evans Avenue, between Jennings Street and Napoleon Street (a nine-block segment—about 6,000 feet), convert one of the two travel lanes in each direction to a transit-only lane at all times. Treatment for transit-only lanes can range from striping to physical elevation changes or barriers to protect transit right-of-way from mixed-flow traffic. The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include extension of transit only lanes in one or both directions between Napoleon Street and Cesar Chavez Street or onto Hunters Point Boulevard and Innes Avenue. **MM TR-24.2** Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 48-Quintara-24th Street. Should mitigation measure MM TR-24.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 48-Quintara-24th Street. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.	**SU/MM**
Impact TR-25 Implementation of the Project would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton.	**PS**	**MM TR-25** Purchase additional transit vehicles to mitigate the Project impacts and Project contribution to cumulative impacts to headways on 54-Felton. SFMTA shall purchase additional transit vehicles to mitigate the Project impacts and Project contribution to cumulative impacts to headways on 54-Felton. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-26 Implementation of the Project would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third.	**PS**	**MM TR-26.1** Maintain the proposed headways of the T-Third. To address Project impacts to the T-Third, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvement that could reduce Project impacts on transit operations along Third Street between Thomas Avenue and Kirkwood Avenue. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the T-Third. ■ Reconfigure the section of Third Street between Thomas Avenue and Kirkwood Avenue (9 blocks) where the light rail vehicles currently share the travel lane with auto traffic to provide a dedicated transit right-of-way, consistent with the rest of the route. This would require either removal of one travel lane in each direction on Third Street, or removal of on-street parking and some sidewalk bulbouts. In addition, left-turns from Third Street in this segment would be restricted in both directions. Treatment for transit-only lanes can range from striping to physical elevation or barriers to protect transit right-of-way from mixed-flow traffic. Implementation of the roadway reconfiguration shall be the responsibility of SFMTA, and shall be implemented when the results of the study described above indicate transit improvements are necessary. The Project Applicant shall fully fund the costs of implementing the transit priority improvements prior to approval of subsequent phases of development. **MM TR-26.2** Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the T-Third. Should mitigation measure MM TR-26.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the T-Third. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.	**SU/MM**
Impact TR-27 Implementation of the Project could increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited.	**PS**	**MM TR-27.1** Ensure transit preferential treatment is accounted for in the design of the Geneva Avenue Extension. The City of Brisbane, as part of the Geneva Avenue Extension Project, shall account for existing traffic, background traffic growth, and the most recent forecasts of traffic expected to be associated with each of several adjacent development projects, including the Project. The San Francisco County Transportation Authority (SFCTA) and SFMTA shall coordinate with the City of Brisbane to ensure transit preferential treatment is accounted for in the design of the Geneva Avenue Extension. **MM TR-27.2** Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 28L-19th Avenue/Geneva Limited. Should mitigation measure MM TR-27.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 28L-19th Avenue/Geneva Limited. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-28 Implementation of the Project would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101.	**PS**	No feasible mitigation is identified.	**SU**
Impact TR-29 Implementation of the Project would not contribute to cumulative impacts on the 14X-Mission Express transit route when on I-280.	**LTS**	No mitigation is required.	**LTS**
Impact TR-30 Implementation of the Project would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified.	**PS**	No feasible mitigation is identified.	**SU**
Impact TR-31 During implementation of the Project, bicycle facilities would be expanded to serve additional users. This would be a beneficial impact of the Project.	**NI**	No mitigation is required.	**NI**
Impact TR-32 Implementation of the Project's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue could result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street.	**PS**	**MM TR-32** Determine the feasibility of relocating Bicycle Routes #70 and #170. Prior to issuance of the grading permit for Development Phase 1, the Project Applicant shall fund a study to determine the feasibility of relocating Bicycle Routes #70 and #170. The study of the bicycle route relocation, necessary environmental clearance documentation, and implementation shall be the responsibility of SFMTA.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-33 During implementation of the Project, pedestrian facilities would be expanded to serve additional users. This would be a beneficial impact of the Project.	**NI**	No mitigation is required.	**NI**
Impact TR-34 Implementation of the Project would result in traffic volumes on area roadways that would not substantially affect pedestrian circulation and safety in the Project vicinity.	**LTS**	No mitigation is required.	**LTS**
Impact TR-35 Implementation of the Project would not result in significant impacts associated with a lack of an adequate supply of parking that could not be accommodated within alternative modes.	**LTS**	No mitigation is required.	**LTS**
Impact TR-36 Implementation of the Project roadway improvements would displace on-street parking spaces, and the existing demand could be accommodated in the nearby vicinity.	**LTS**	No mitigation is required.	**LTS**
Impact TR-37 Implementation of the Project would not result in significant impacts associated with a lack of adequate supply of loading spaces.	**LTS**	No mitigation is required.	**LTS**
Impact TR-38 For as many as 12 times a year, 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections.	**PS**	**MM TR-38** Transportation Management Plan (TMP) for the stadium. The stadium operators shall develop and maintain a Transportation Management Plan (TMP) for the stadium. The stadium operator shall work with representatives from the SFMTA, the State Highway Patrol, the Police Department, private charter operators, Caltrain and others on a continuing basis to develop and refine the TMP, as determined appropriate by SFMTA. The final stadium TMP shall be approved by SFMTA. Preparation of the TMP shall be fully funded by the stadium operator, and shall be completed in time for implementation on opening day of the stadium. The following actions shall be included in the TMP: ■ Information on transportation options to the stadium, including game day service by the various regional service providers shall be distributed to season ticket holders, employees, and other patrons if possible.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ A brochure, information packet, and/or web page providing full information on transit access to the stadium, similar to that currently offered at the 49ers website, shall be updated and maintained. ■ The use of charter buses to the stadium shall be encouraged and expanded. A number of measures shall be considered that could be implemented at low-cost to expand the use of group charters, including reduced parking costs, publicize the groups in 49ers publications and mailings, provide priority parking, provide lounges for bus drivers and provide support services for rooter clubs. ■ Residential Permit Parking Program and/or additional parking restrictions, such as time limits, during game days, particularly in the Bayview Hunters Point areas, shall be explored with residents to reduce potential for intrusion of stadium vehicles into the adjacent neighborhood during a football game or secondary event. ■ The stadium operator shall implement measures to encourage carpools of 4-plus persons per vehicle. ■ The stadium operator shall charge a higher parking cost for low occupancy vehicles. ■ The stadium operator shall develop a separate TDM plan for employees of the stadium and concessionaires. The plan shall consider measures such as providing employees and concessionaires with free or subsidized transit passes to encourage transit use and reduce vehicular travel to the stadium. Employees shall not receive preferential parking. ■ The stadium operator shall develop measures with CPSRA to ensure that game day spectators do not park in CPSRA day use parking lots. Strategies to be explored include limiting parking in CPSRA lots to a limited duration during game days (e.g., to a two-hour period), or an increase in parking fees equivalent to game day parking, and ticketing and enforcement. ■ The TMP shall ensure that regular transit routes operate acceptably near the stadium. The plan should consider providing alternate routes for those transit lines that do not have exclusive right-of-way on game days (48-Quintara-24th Street, 44-O'Shaughnessy, 29-Sunset) onto transit-only facilities such as the BRT right-of-way to the south and Palou Avenue to the north (which would be a transit-only facility on game days).	
● **Impact TR-39** Implementation of the Project with existing game day service and Project transit improvements would not be adequate to accommodate projected transit demand.	**PS**	**MM TR-39** *Transit Service during Game Days.* SFMTA shall increase frequency on regularly scheduled Muni routes serving the stadium area on game days. In addition, the stadium operator shall fund additional Muni shuttle service between the stadium and regional transit service, including BART (Balboa Park and/or Glen Park Station) and Caltrain (Bayshore Station). Although the specific frequencies of individual routes should be determined based on patron characteristics that may evolve over time, the increased transit service, taken as an aggregate, should generally compensate for the projected shortfall of 3,600 passengers per hour on the existing and proposed transit lines. Prior to opening day at the new stadium, the City and stadium operator shall determine costs associated with the increased service and determine funding sources. Examples of funding sources that shall be considered include a surcharge on game tickets or other such revenue mechanism. Implementation of increased transit service would be the responsibility of SFMTA and the stadium operator, and would be implemented when projected attendance warrants additional service.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-40 For as many of 12 times per year during game days, bicycle access in the vicinity of the proposed stadium would be constrained, however, accommodations for bicycle access and circulation would be provided.	**LTS**	No mitigation is required.	**LTS**
Impact TR-41 For as many of 12 times per year during game days, pedestrian access in the vicinity of the proposed stadium would be constrained, however, accommodations for pedestrian access and circulation would be provided.	**LTS**	No mitigation is required.	**LTS**
Impact TR-42 For as many as 12 times per year during game days, access to state park facilities for vehicles, bicyclists and pedestrians would be constrained, and heavy traffic congestion could discourage use of the park. However, access for vehicles, bicyclists, and pedestrians would be maintained.	**LTS**	No mitigation is required.	**LTS**
Impact TR-43 For as many of 12 times per year during game days, parking demand associated with sell-out events would exceed the proposed on-site supply, resulting in a parking supply shortfall. The shortfall would be accommodated within other on-street and off-street parking facilities, and some patrons may elect to take transit to the stadium.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-44 Implementation of the Project would result in stadium game day loading demand that would be accommodated within the proposed on-site supply.	**LTS**	No mitigation is required.	**LTS**
Impact TR-45 During game days, accommodation for emergency access would be provided.	**LTS**	No mitigation is required.	**LTS**
● **Impact TR-46** Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp.	**PS**	**MM TR-46** Traffic Control Officers. The stadium operator shall develop as part of a stadium Transportation Management Plan (TMP), a strategy for coordinating with representatives of SFMTA and the SF Police Department for deploying traffic control officers in the Project vicinity to increase efficiency of pre- and post- event traffic, similar to what would be in place for football game days. The secondary event component of the stadium TMP shall be approved by SFMTA. The stadium operator shall fully fund implementation of the secondary event (i.e., non-49ers football events) measures.	**SU/MM**
● **Impact TR-47** With implementation of the Project, the existing transit service and Project improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.	**PS**	**MM TR-47** Transit Service during Secondary Events. SFMTA shall increase frequency on regularly scheduled Muni routes serving the stadium area prior to large special events. In addition, the stadium operator shall fund additional Muni shuttle service between the stadium and regional transit service, including BART (Balboa Park and/or Glen Park stations) and Caltrain (Bayshore station). ■ Routes 24-Divisadero, 28L-19th Avenue Limited, and 44-O'Shaughnessey would already be operating near their maximum frequency. Therefore, this mitigation measure primarily applies to the 48-Quintara-24th Street route and the new HPX service. If each of these routes were increased to have five-minute frequencies (typically considered the maximum frequency that can be regularly maintained), the transit capacity toward the stadium would increase by 828 passengers per hour, for a total of 3,928 passengers. Even with the additional service on these two lines, there would be a shortfall of 1,797 passengers per hour in transit capacity. ■ Additional express service to key regional transit destinations and regional charter express service, similar to what is offered on football game days, would offset a portion of the shortfall in transit capacity. The amount and nature of special service to special stadium events would depend on the type and size of the special event. Generally, the capacity of the express service should compensate for the shortfall of 1,797 passengers per hour for a 37,500-person event (transit supply, would of course, be designed on a case-by-case basis depending on the expected size of the secondary event).	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ SFMTA and the stadium operator shall implement a stadium transportation systems plan similar to that developed for game-day operations (except that the Yosemite Slough bridge shall not be available for private automobiles), on a case-by-case basis depending on the expected size of the secondary event. Prior to opening day at the new stadium, the City and the stadium operator shall determine costs associated with the increased service and determine funding requirements. Examples of funding sources that shall be considered include a surcharge on game tickets, parking or admission surcharge, or other such revenue mechanism. Implementation of increased transit service would be the responsibility of SFMTA and the stadium operator, and would be implemented when projected attendance warrants additional service.	
Impact TR-48 With implementation of the Project, bicycle circulation would not be impeded during secondary events at the stadium.	**LTS**	No mitigation is required.	**LTS**
Impact TR-49 With implementation of the Project, pedestrian circulation would not be impeded during arena events.	**LTS**	No mitigation is required.	**LTS**
Impact TR-50 With implementation of the Project, parking demand associated with a secondary event with an attendance of 37,500 spectators would be accommodated within the proposed supply.	**LTS**	No mitigation is required.	**LTS**
Impact TR-51 With implementation of the Project, weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Project conditions without an arena event.	**PS**	**MM TR-51** Transportation Management Plan (TMP). The arena operator shall develop a Transportation Management Plan (TMP) for coordinating with representatives of SFMTA and the SF Police Department for deploying traffic control officers in the Project vicinity to increase efficiency of pre- and post- event traffic, and for developing incentives to increase transit ridership to the arena. If Variants 1, 2, or 2A are implemented the TMP shall provide for SFMTA to increase the frequency on regularly scheduled Muni routes (primarily the CPX-Candlestick Express) serving the arena area prior to large events at the arena and for the arena operator to provide additional shuttle service to key regional transit destinations, such as BART, Caltrain, and the T-Third light-rail route. Implementation of this mitigation measure would likely speed vehicle entrance and exit to the arena site as well as maintain orderly traffic and transit operations and reduce intrusion onto minor routes to and from the arena. Traffic control officers would facilitate traffic flow at the intersection of Harney/Jamestown which would operate at LOS F conditions with a sell-out arena event. The final arena TMP shall be approved by SFMTA. Preparation of the TMP Plan shall be fully funded by the arena operator, and shall be completed in time for implementation on opening day of the arena.	**SU/MM**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact TR-52 With implementation of the Project, sell-out weekday evening events at the arena could impact existing and proposed transit service.	**PS**	MM TR-23.1 would apply to this impact.	**SU/MM**
Impact TR-53 With implementation of the Project, bicycle circulation would not be impeded during arena events.	**LTS**	No mitigation is required.	**LTS**
Impact TR-54 With implementation of the Project, pedestrian circulation would not be impeded during arena events.	**LTS**	No mitigation is required.	**LTS**
Impact TR-55 With implementation of the Project, arena parking demand would be accommodated on street and within proposed off-street parking facilities.	**LTS**	No mitigation is required.	**LTS**
Impact TR-56 Implementation of the Project would not impact air traffic.	**NI**	No mitigation is required.	**NI**
Impact TR-57 Implementation of the Project would not create hazards due to any proposed design features.	**LTS**	No mitigation is required.	**LTS**
Impact TR-58 Implementation of the Project would not result in significant emergency access impacts.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.E (AESTHETICS)	
Impact AE-1 Construction activities associated with the Project would not have a substantial adverse effect on a scenic vista or scenic resources.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact AE-2 Construction activities associated with the Project would not result in temporary degradation of the visual character or quality of the site.	**PS**	**MM AE-2** Mitigation for Visual Character/Quality Impacts During Construction. Construction documents shall require all construction contractors to strictly control the staging of construction equipment and the cleanliness of construction equipment stored or driven beyond the limits of the construction work area. Construction equipment shall be parked and staged on the Project site. Staging areas shall be screened from view at street level with solid wood fencing or green fence. Prior to the issuance of building permits, the Project Applicant (through the construction contractor[s]) shall submit a construction staging, access, and parking plan to the San Francisco Department of Building Inspection for review and approval. On-street parking of construction worker vehicles shall be prohibited. Vehicles shall be kept clean and free of mud and dust before leaving the Project site. Project contractors shall sweep surrounding streets used for construction access daily and maintain them free of dirt and debris.	**LTS/M**
Impact AE-3 Construction activities associated with the Project would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties.	**LTS**	No mitigation is required.	**LTS**
Impact AE-4 Implementation of the Project would not have a substantial adverse effect on a scenic vista.	**LTS**	No mitigation is required.	**LTS**
Impact AE-5 Implementation of the Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting.	**LTS**	No mitigation is required.	**LTS**
Impact AE-5a Implementation of the Project at Candlestick Point would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact AE-5b Implementation of the Project at HPS Phase II would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting.	**LTS**	No mitigation is required.	**LTS**
Impact AE-6 Implementation of the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.	**LTS**	No mitigation is required.	**LTS**
Impact AE-6a Implementation of the Project at Candlestick Point would not substantially degrade the existing visual character or quality of the site or its surroundings.	**LTS**	No mitigation is required.	**LTS**
Impact AE-6b Implementation of the Project at HPS Phase II would not substantially degrade the visual character or quality of the site or its surroundings.	**LTS**	No mitigation is required.	**LTS**
Impact AE-7 Implementation of the Project would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties.	**PS**	**MM AE-7a.1**, **MM AE-7a.2**, **MM AE-7a.3**, **MM AE-7a.4**, **MM AE-7b.1**, and **MM AE-7b.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact AE-7a Implementation of the Project at Candlestick Point would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties.	**PS**	**MM AE-7a.1** Lighting Direction/Fixtures and Screening Walls to Minimize Glare and Light Spill. The Project Applicant shall ensure that all parking lot and other security lighting shall be directed away from surrounding land uses and towards the specific location intended for illumination. State-of-the-art fixtures shall be used, and all lighting shall be shielded to minimize the production of glare and light spill onto surrounding use. All parking structures shall be constructed with screening walls of sufficient height to block spill light from vehicle headlights. **MM AE-7a.2** Low-level/Unobtrusive Light Fixtures. The Project Applicant shall ensure that landscape illumination and exterior sign lighting shall be accomplished with low-level, unobtrusive fixtures. **MM AE-7a.3** Lighting Plan. The Project Applicant shall prepare a lighting plan for each phase of the Project and submit it for review and approval to the San Francisco Police Department and the Agency prior to the issuance of building permits. Outdoor lighting shall maintain a minimum required illumination, as determined appropriate by the San Francisco Police Department and the Planning Department, for all parking and pedestrian areas. In addition, the plan shall include details such as beam spreads and/or photometric calculation, location and type of fixtures, exterior colors, details on foundations, and arrangement of exterior lighting such that it does not create glare, hazardous interference on adjacent streets, or properties or result in spill light that would adversely impact sensitive receptors in the project area. **MM AE-7a.4** Non-reflective Exterior Surfaces to Minimize Glare Impacts. The Project Applicant shall ensure that design of the proposed structures shall include the use of textured or other nonreflective exterior surfaces and nonreflective glass.	**LTS/M**
Impact AE-7b Implementation of the Project at HPS Phase II would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties.	**PS**	**MM AE-7b.1** Testing of the Field-Lighting System. Prior to opening the stadium, the Stadium Operator shall test the installed field-lighting system to ensure that lighting meets operating requirements in the stadium and minimizes obtrusive spill lighting in the ballpark facility. Testing shall include light-meter measurements at selected locations in the vicinity to measure spill lighting from stadium field-lighting fixtures, permit adjustment of lighting fixtures, and confirm that spill-lighting effects shall be within an acceptable range and compatible with typical street lighting fixtures. **MM AE-7b.2** Stadium Lighting Orientation and Cut-Off Shields. Prior to opening the stadium, the Stadium Operator shall ensure that stadium lighting is oriented in such a manner to reduce the amount of light shed onto sensitive receptors and incorporate "cut-off" shields as appropriate to minimize any increase in lighting at adjacent properties, providing that it still meets the standard of lighting for football operations.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		SECTION III.F (SHADOWS)	
Impact SH-1 Implementation of the Project would not result in new structures with the potential to cast shadows on existing or proposed parks and open space in a manner that would have an adverse effect on the use of the open space.	**LTS**	No mitigation is required.	**LTS**
Impact SH-1a Implementation of the Project at Candlestick Point would not result in new structures with the potential to cast shadows on existing or proposed parks and open space in a manner that would have an adverse effect on the use of the open space.	**LTS**	No mitigation is required.	**LTS**
Impact SH-1b Implementation of the Project at HPS Phase II would not result in new structures with the potential to cast shadows on existing or proposed parks and open space in a manner that would have an adverse effect on the use of the open space.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.G (WIND)	
Impact W-1 Implementation of the Project would not include tall structures that would result in ground-level-equivalent wind speed exceeding 26 mph for a single hour of the year in pedestrian corridors and public spaces.	**PS**	**MM W-1(a)** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact W-1a Implementation of the Project at Candlestick Point would not include tall structures that would result in ground-level-equivalent wind speed exceeding 26 mph for a single hour of the year in pedestrian corridors and public spaces.	**PS**	**MM W-1a** Building Design Wind Analysis. Prior to design approval of Project buildings, for high-rise structures above 100 feet, the Project Applicant shall retain a qualified wind consultant to provide a wind review to determine if the exposure, massing, and orientation of the building would result in wind impacts that could exceed the threshold of 26-mph-equivalent wind speed for a single hour during the year. The wind analysis shall be conducted to assess wind conditions for the proposed building(s) in conjunction with the anticipated pattern of development on surrounding blocks to determine if the Project building(s) would cause an exceedance of the wind hazard standard. The analysis shall be conducted as directed by the City's wind study guidelines, including, if required, wind tunnel modeling of potential adverse effects relating to hazardous wind conditions. The Agency shall require the Project Applicant to identify design changes that would mitigate the adverse wind conditions to below the threshold of 26-mph-equivalent wind speed for a single hour of the year. These design changes could include, but are not limited to, wind-mitigating features, such as placing towers on podiums with a minimum 15-foot setback from street edges, placement of awnings on building frontages, street and frontage plantings, articulation of building facades, or the use of a variety of architectural materials.	**LTS/M**
Impact W-1b Implementation of the Project at HPS Phase II would not include tall structures that would result in ground-level-equivalent wind speed exceeding 26 mph for a single hour of the year in pedestrian corridors and public spaces.	**PS**	**MM W-1(a)** would apply to this impact.	**LTS/M**
		SECTION III.H (AIR QUALITY)	
Impact AQ-1 Construction activities associated with the Project would not result in short-term increases in emission of criteria air pollutants and precursors that exceed BAAQMD CEQA significance criteria.	**PS**	**MM HZ-15** would apply to this impact.	**LTS/M**
Impact AQ-2 Construction activities associated with the Project would not result in impacts to on-site and off-site populations from Project-generated emissions of DPM.	**PS**	**MM AQ-2.1** and **MM AQ-2.2** would apply to this impact	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact AQ-2a Construction at Candlestick Point would not result in impacts to off-site populations from Project-generated emissions of DPM.	**PS**	**MM AQ 2.1** Implement Emission Control Device Installation on Construction. To reduce DPM emissions during Project construction, the Project Applicant shall require construction equipment used for the Project to utilize emission control technology such that 50% of the fleet will meet USEPA Tier 2 standards outfitted with California ARB Level 3 VDECS (Verified Diesel Emission Control Strategies) for particulate matter control (or equivalent) during the first two years of construction activities, increasing to 75% of the fleet in the third year and 100% of the fleet starting in the fourth year and for the duration of the Project.	**LTS/M**
Impact AQ-2b Construction at HPS Phase II would not result in impacts to off-site populations from Project-generated emissions of DPM.	**PS**	**MM AQ-2.1** would apply to this impact.	**LTS/M**
Impact AQ-2c Construction activities associated with the Project would not result in impacts to the existing Alice Griffith Public Housing from Project-generated emissions of DPM.	**PS**	**MM AQ-2.1** would also apply to this impact. **MM AQ-2.2** Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels. In addition to mitigation measure MM AQ-2.1, in order to minimize the potential impacts to residents living in Alice Griffith from the construction activities in that area, the Project Applicant will require that all construction equipment used in the Alice Griffith parcels (CP01 though CP06) utilize equipment which meets the USEPA Tier 2 standards outfitted with California ARB Level 3 VDECS (Verified Diesel Emission Control Strategies) for particulate matter control (or equivalent) throughout the entire duration of construction activities on those parcels.	**LTS/M**
Impact AQ-3 Construction activities associated with the Project would not result in impacts to off-site and Alice Griffith populations from emissions of TACs bound to soil-PM_{10}.	**PS**	**MM HZ-15** would apply to this impact.	**LTS/M**
Impact AQ-3a Construction at Candlestick Point would not result in impacts to off-site and Alice Griffith populations from emissions of TACs bound to soil-PM_{10}.	**PS**	**MM HZ-15** would apply to this impact.	**LTS/M**
Impact AQ-3b Construction at HPS Phase II would not result in impacts to off-site and Alice Griffith populations from emissions of TACs bound to soil-PM_{10}.	**PS**	**MM HZ-15** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact AQ-4 Operation of the Project would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full buildout.	**S**	No feasible mitigation is available.	**SU**
Impact AQ-5 Operation of the Project would not cause local concentrations of CO to exceed State and federal ambient air quality standards due to motor vehicles trips.	**LTS**	No mitigation is required.	**LTS**
Impact AQ-6 Implementation of HPS Phase II would not expose nearby receptors to an increase in local concentrations of toxic air contaminants due to the operation of Research and Development uses.	**PS**	**MM AQ-6.1** If a facility with sources of TAC emission wishes to locate on a plot size smaller than 1 acre, an analysis will be required to show the facility, in conjunction with all other TAC emitting facilities in the R&D areas, will not cause these thresholds of a residential cancer risk of 10 in one million and a chronic noncancer HI of 1.0 to be exceeded at the nearest residential locations. **MM AQ-6.2** Each facility with sources of TAC emissions on a plot of 1 acre or larger will limit their emissions such that residential cancer risk and chronic non-cancer hazard index evaluated at the facility boundary does not exceed 10 in one million or 1.0, respectively. If these thresholds are exceeded at the boundary, an analysis will be required to show the facility, in conjunction with all other TAC emitting facilities in the R&D areas, will not cause these thresholds to be exceeded at the nearest residential locations.	**LTS/M**
Impact AQ-7 Operation of the Project would not expose receptors to concentrations of $PM_{2.5}$ above a 0.2 $\mu g/m^3$ action level for $PM_{2.5}$ and, therefore, would not substantially affect the health of nearby receptors as a result of an increase in local concentrations of vehicle emissions ($PM_{2.5}$) associated with vehicle use attributable to operation of the Project.	**LTS**	No mitigation is required.	**LTS**
Impact AQ-8 Implementation of the Project would not generate objectionable odors affecting a substantial number of people.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact AQ-9 The Project would conform to the current regional air quality plan.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.I (NOISE AND VIBRATION)	
Impact NO-1 Construction activities associated with the Project would generate increased noise levels for both off-site and on-site sensitive receptors; however, the Project's construction noise impacts would occur primarily in noise-sensitive areas adjacent or near to active construction sites (which would vary in location and duration over the entire period the proposed Project would be under construction); they would also not occur during recognized sleep hours, and would be consistent with the requirements for construction noise that exist in Sections 2907 and 2908 of the *Municipal Code*.	**PS**	**MM NO.1a.1** and **MM NO-1a.2** would apply to this impact.	**LTS/M**
Impact NO-1a Construction at Candlestick Point would generate increased noise levels for both off-site and on-site sensitive receptors; however, the Project's construction noise impacts would occur primarily in noise-sensitive areas adjacent or near to active construction sites (which would vary in location and duration over the entire period the proposed Project would be under construction), they would not occur during recognized sleep	**PS**	**MM NO-1a.1** Construction Document Mitigation to Reduce Noise Levels during Construction. The Project Applicant shall incorporate the following practices into the construction documents to be implemented by the Project contractor: ■ Provide enclosures and mufflers for stationary equipment, shrouding or shielding for impact tools, and barriers around particularly noisy operations on the site ■ Use construction equipment with lower noise emission ratings whenever possible, particularly air compressors ■ Provide sound-control devices on equipment no less effective than those provided by the manufacturer ■ Locate stationary equipment, material stockpiles, and vehicle staging areas as far as practicable from sensitive receptors ■ Prohibit unnecessary idling of internal combustion engines	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
hours, and would be consistent with the requirements for construction noise that exist in Sections 2907 & 2908 of the *Municipal Code*.		■ Require applicable construction-related vehicles and equipment to use designated truck routes to access the Project site ■ Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, noise barriers or noise blankets. The placement of such attenuation measures will be reviewed and approved by the Director of Public Works prior to issuance of development permits for construction activities. ■ Designate a Noise Disturbance Coordinator who shall be responsible for responding to complaints about noise during construction. The telephone number of the Noise Disturbance Coordinator shall be conspicuously posted at the construction site and shall be provided to the City. Copies of the construction schedule shall also be posted at nearby noise-sensitive areas. **MM NO-1a.2** Noise-reducing Pile Driving Techniques and Muffling Devices. The Project Applicant shall require its construction contractor to use noise-reducing pile driving techniques if nearby structures are subject to pile driving noise and vibration. These techniques include pre-drilling pile holes (if feasible, based on soils) to the maximum feasible depth, installing intake and exhaust mufflers on pile driving equipment, vibrating piles into place when feasible, and installing shrouds around the pile driving hammer where feasible. Contractors shall be required to use construction equipment with state-of-the-art noise shielding and muffling devices. In addition, at least 48 hours prior to pile-driving activities, the Project Applicant shall notify building owners and occupants within 500 feet of the Project site of the dates, hours, and expected duration of such activities.	
Impact NO-1b Construction at HPS Phase II would generate increased noise levels for both off-site and on-site sensitive receptors; however, the Project's construction noise impacts would be temporary, they would also not occur during recognized sleep hours, and would be consistent with the requirements for construction noise that exist in Sections 2907 and 2908 of the *Municipal Code*.	**PS**	**MM NO-1a.1** and **MM NO-1a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact NO-2 Construction activities associated with the Project would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 & 2908 of the *Municipal Code*, vibration levels would still be significant.	**S**	**MM NO-1a.1, MM NO-1a.2,** and **MM NO-2a** would apply to this impact.	**SU/M**
Impact NO-2a Construction activities at Candlestick Point would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 & 2908 of the *Municipal Code*, vibration levels would still be significant.	**S**	**MM NO-2a** Pre-construction Assessment to Minimize Pile Driving Impacts. The Project Applicant shall require its geotechnical engineering contractor to conduct a pre-construction assessment of existing subsurface conditions and the structural integrity of nearby buildings subject to pile driving impacts prior to receiving a building permit. If recommended by the geotechnical engineer, for structures or facilities within 50 feet of pile driving, the Project Applicant shall require groundborne vibration monitoring of nearby structures. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the following: ■ Pre-pile driving surveying of potentially affected structures. ■ Underpinning of foundations of potentially affected structures, as necessary. ■ The construction plan shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of an excavation. Monitoring results shall be submitted to DBI. In the event of unacceptable ground movement, as determined by DBI inspections, all pile driving work shall cease and corrective measures shall be implemented. The pile driving program and ground stabilization measures shall be reevaluated and approved by DBI. **MM NO-1a.1** and **MM NO-1a.2** would apply to this impact.	**SU/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact NO-2b Rock removal in the Alice Griffith and Jamestown districts would result in vibration levels that exceed the FTA threshold of 80 VdB or could cause damage to structures from vibration caused by the fracturing of bedrock for excavation.	**S**	**MM NO-1a.1** and **MM GE-3a** would apply to this impact.	**SU/M**
Impact NO-2c Construction at HPS Phase II would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 & 2908 of the *Municipal Code*, vibration levels would be significant.	**S**	**MM NO-1a.1, MM NO-1a.2,** and **MM NO-2a** would apply to this impact.	**SU/M**
Impact NO-3 Construction activities associated with the Project would result in a substantial temporary or periodic increase in ambient noise levels.	**S**	**MM NO-1a.1, MM NO-1a.2,** and **MM NO-2a** would apply to this impact.	**SU/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact NO-4 Implementation of the Project, including the use of mechanical equipment or the delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City.	**LTS**	No mitigation is required.	**LTS**
Impact NO-5 Implementation of the Project would not generate or expose persons on or off site to excessive groundborne vibration.	**LTS**	No mitigation is required.	**LTS**
Impact NO-6 Operation of the Project would generate increased local traffic volumes that could cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.	**S**	No feasible mitigation is available.	**SU**
Impact NO-7 Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert.	**S**	**MM NO-7.1** Mitigation to Minimize Game/Concert-related Temporary Increases in Ambient Noise Levels at Nearby Residences. To ensure that stadium game-and event-induced interior L_{max} noise levels do not exceed an interior noise level of 60 dBA and interfere with speech and other indoor activities in the existing Hunters Point Hill residential community closest to and north of the proposed Stadium (i.e., as identified by the R3 stadium noise model receiver), the Stadium Operator shall: ■ After Stadium Operator enters into lease agreement with Agency, send notification of the establishment of a stadium noise mitigation program (SNMP) to the residential property owners in the identified neighborhood potentially affected by noise from the proposed Stadium ■ Allow property owners an appropriate time after the date of notification about the SNMP to apply for the program, with a reminder sent to the owners before the end of the application period ■ Determine if responding property owners meet qualifications ■ Compile for property-owners reference and send to them a summary of standard types of structural acoustical mitigations ■ Choose a qualified acoustical consultant to survey the potentially affected residential units and recommend sound reduction measures appropriate to offset the modeled stadium noise impacts, which may include: > Acoustical upgrades to windows and doors	**SU/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		> Acoustical stripping around doors and other openings > Ventilation improvements ■ Estimates cost of recommended sound reduction measures, which shall include labor and materials, permit fees, and City inspections; material costs will, as much as possible, be based on "like-for-like", that is, for replacement of existing materials similar in quality or appearance ■ Pay each qualifying property owner the amount of this estimate after obtaining a release from future claims for stadium event noise impacts at each property with each property owner responsible for implementing the sound reduction improvements ■ Establish an ad hoc community working group of neighbors to develop a mediation process should any future disputes arise over the effectiveness of the SNMP in eliminating stadium noise intrusions **MM NO-7.2** Residential Use Plan Review by Qualified Acoustical Consultant. To ensure that stadium game-and event-induced interior L_{max} noise levels do not exceed an interior noise level of 60 dBA and interfere with speech and other indoor activities in the proposed on-site residential uses closest to the proposed Stadium, the Project Applicant shall choose a qualified acoustical consultant to review plans for the new residential uses planned for areas closest to the proposed Stadium and follow their recommendations to provide acoustic insulation or other equivalent measures to ensure that interior peak noise events would not exceed 60 dBA L_{max}.	
Impact NO-8 Implementation of the Project would not expose residents and visitors to excessive noise levels from flights from San Francisco International Airport such that the noise would be disruptive or cause annoyance.	**LTS**	No mitigation is required.	**LTS**
SECTION III.J (CULTURAL RESOURCES AND PALEONTOLOGICAL RESOURCES)			
Impact CP-1 Construction activities associated with the Project could result in a substantial adverse change in the significance of a historical resource.	**S**	**MM CP-1b.1** and **MM CP-1b.2** apply to this impact.	**SU/M**
Impact CP-1a Construction at Candlestick Point would not result in a substantial adverse change in the significance of an historical resource.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact CP-1b Construction at HPS Phase II could result in a substantial adverse change in the significance of an historical resource.	**S**	**MM CP-1b.1** Mitigation to Minimize Impacts on Historic Resources at HPS Phase II. To reduce the adverse effect on historical resources, prior to any structural demolition and removal activities, the Project Applicant shall retain a professional who meets the Secretary of the of the Interior's Professional Qualifications Standards for Architectural History to prepare written and photographic documentation of the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, as identified in the report titled *Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Draft Historic Resources Survey and Technical Report*, July 2009, prepared by Circa Historic Property Development. The documentation for the property shall be prepared based on the National Park Services' (NPS) Historic American Building Survey (HABS) / Historic American Engineering Record (HAER) Historical Report Guidelines. This type of documentation is based on a combination of both HABS/HAER standards (Levels II and III) and NPS new policy for NR-NHL photographic documentation as outlined in the National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion (March 2005). The written historical data for this documentation shall follow HABS / HAER Level I standards. The written data shall be accompanied by a sketch plan of the property. Efforts should also be made to locate original construction drawings or plans of the property during the period of significance. If located, these drawings should be photographed, reproduced, and included in the dataset. If construction drawings or plans cannot be located as-built drawings shall be produced. Either HABS / HAER standard large format or digital photography shall be used. If digital photography is used, the ink and paper combinations for printing photographs must be in compliance with NR-NHL photo expansion policy and have a permanency rating of approximately 115 years. Digital photographs will be taken as uncompressed .TIF file format. The size of each image will be 1600x1200 pixels at 300 ppi (pixels per inch) or larger, color format, and printed in black and white. The file name for each electronic image shall correspond with the index of photographs and photograph label. Photograph views for the dataset shall include *(a)* contextual views; *(b)* views of each side of each building and interior views, where possible; *(c)* oblique views of buildings; and *(d)* detail views of character-defining features, including features on the interiors of some buildings. All views shall be referenced on a photographic key. This photograph key shall be on a map of the property and shall show the photograph number with an arrow indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the dataset. All written and photographic documentation of the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District shall be approved by the SFRA, in consultation with the ERO, prior to any demolition and removal activities. **MM CP-1b.2** Interpretive Displays Depicting History of HPS. Interpretive displays related to the history of HPS shall be installed at Heritage Park at Dry Dock Nos. 2 and 3. The number and type of displays shall be approved by the SFRA, in consultation with the ERO.	**SU/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact CP-2 Construction activities associated with the Project would not result in a substantial adverse change in the significance of archaeological resources, including prehistoric Native American resources, Chinese fishing camps, and maritime related resources.	**PS**	**MM CP-2a** would apply to this impact.	**LTS/M**
Impact CP-2a Construction at Candlestick Point would not result in a substantial adverse change in the significance of archaeological resources, including prehistoric Native American, Chinese fishing camp, and maritime-related archaeological remains.	**PS**	**MM CP-2a** Mitigation to Minimize Impacts to Archaeological Resources at Candlestick Point. Based on a reasonable presumption that archaeological resources may be present within the Project site, the following measures shall be undertaken to avoid any potentially significant adverse effect from the Project on buried or submerged historical resources. Overview: The Project Applicant shall retain the services of a qualified archaeological consultant having expertise in California prehistoric and urban historical archeology. The archaeological consultant shall undertake an archaeological testing program as specified herein. In addition, the archaeological consultant shall be available to conduct an archaeological monitoring and/or data recovery program if required pursuant to this measure. The archaeological consultant's work shall be conducted in accordance with this measure and with the requirements of the Project Archaeological Research Design and Treatment Plan (Archeo-Tec. Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California, 2009) at the direction of the City's Environmental Review Officer (ERO). In instances of inconsistency between the requirement of the Project Archaeological Research Design and Treatment Plan and of this archaeological mitigation measure, the requirement of this archaeological mitigation measure shall prevail. All plans and reports prepared by the consultant as specified herein shall be submitted first and directly to the ERO for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Archaeological monitoring and/or data recovery programs required by this measure could suspend construction of the Project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce potential effects on a significant archaeological resource as defined in CEQA Guidelines Section 15064.5(a)(c) to a less-than-significant level. Archaeological Testing Program: The archaeological consultant shall prepare and submit to the ERO for review and approval an archaeological testing plan (ATP). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the Project, the testing method to be used, and the locations recommended for testing. The purpose of the archaeological testing program will be to determine to the extent possible the presence or absence of archaeological resources and to identify and to evaluate whether any archaeological resource encountered on the site constitutes an historical resource under CEQA.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		At the completion of the archaeological testing program, the archaeological consultant shall submit a written report of the findings for submittal to the ERO. If, based on the archaeological testing program, the archaeological consultant finds that significant archaeological resources may be present, the ERO (in consultation with the archaeological consultant) shall determine if additional measures are warranted. Additional measures that may be undertaken include, but are not necessarily limited to, additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. If the ERO determines that a significant archaeological resource is present and that the resource could be adversely affected by the Project, the Project Applicant shall either: a. Re-design the Project so as to avoid any adverse effect on the significant archaeological resource; or b. Implement a data recovery program, unless the ERO determines that the archaeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible. Archaeological Monitoring Program: If the ERO, in consultation with the archaeological consultant, determines that an Archaeological Monitoring Program (AMP) shall be implemented, the AMP shall include the following provisions, at a minimum: ■ The archaeological consultant, Project Applicant, and ERO shall meet and consult on the scope of the AMP prior to the commencement of any Project-related soils disturbing activities. The ERO, in consultation with the archaeological consultant, shall determine what Project activities shall be archaeologically monitored. In most cases, any soils- disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), and site remediation, shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context. ■ The archaeological consultant shall train all Project construction personnel who could reasonably be expected to encounter archaeological resources of the expected resource(s), how to identify the evidence of the expected resource(s), and the appropriate protocol in the event of apparent discovery of an archaeological resource. ■ The archaeological monitor(s) shall be present on the Project site according to a schedule agreed upon by the archaeological consultant and the ERO until the ERO has, in consultation with the archaeological consultant, determined that Project construction activities could have no effects on significant archaeological deposits. ■ The archaeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis. ■ If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the deposit shall cease. The archaeological monitor shall be authorized to temporarily halt demolition/excavation/pile driving/construction activities and equipment until the deposit is evaluated. If, in the case of pile driving activity (foundation, shoring, etc.), the archaeological monitor has cause to believe that the pile driving activity may affect an archaeological resource, the pile driving activity shall be terminated until an	

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

appropriate evaluation of the resource has been made in consultation with the ERO. The archaeological consultant shall immediately notify the ERO of any encountered archaeological deposit. The archaeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit and present the findings of this assessment to the ERO as expeditiously as possible.

- Whether or not significant archaeological resources are encountered, the archaeological consultant shall submit a written report of the findings of the monitoring program to the ERO.

Archaeological Data Recovery Program: The archaeological data recovery program shall be conducted in accord with an Archaeological Data Recovery Plan (ADRP). The archaeological consultant, Project Applicant, and ERO shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archaeological consultant shall submit a draft ADRP to the ERO. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the Project. Destructive data recovery methods shall not be pursued if nondestructive methods are practical.

The scope of the ADRP shall include the following elements:

- Field Methods and Procedures. Descriptions of proposed field strategies, procedures, and operations.
- Cataloguing and Laboratory Analysis. Description of selected cataloguing system and artifact analysis procedures.
- Discard and Deaccession Policy. Description of and rationale for field and post-field discard and deaccession policies.
- Interpretive Program. Consideration of an on-site/off-site public interpretive program during the course of the archaeological data recovery program.
- Security Measures. Recommended security measures to protect the archaeological resource from vandalism, looting, and other potentially damaging activities.
- Final Report. Description of proposed report format and distribution of results.
- Curation. Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.

Human Remains and Associated or Unassociated Funerary Objects: The treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity shall comply with applicable state and federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		remains, notification of the California State Native American Heritage Commission (NAHC), which shall appoint a Most Likely Descendant (MLD) (PRC Sec. 5097.98). The archaeological consultant, Project Applicant, and MLD shall make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines Sec. 15064.5(d)). The agreement shall take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. Final Archaeological Resources Report: The archaeological consultant shall submit a Draft Final Archaeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archaeological resource and describes the archaeological and historical research methods employed in the archaeological testing/monitoring/data recovery program(s). Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Major Environmental Analysis division of the Planning Department shall receive three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than presented above.	
Impact CP-2b Construction at HPS Phase II would not result in a substantial adverse change in the significance of archaeological resources, including prehistoric Native American resources, Chinese fishing camps, and maritime related resources.	**PS**	**MM CP-2a** would apply to this impact.	**LTS/M**
Impact CP-3 Construction activities associated with the Project would not result in a substantial adverse change in the significance of a paleontological resource.	**PS**	**MM CP-3a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact CP-3a Construction at Candlestick Point would not result in a substantial adverse change in the significance of a paleontological resource.	**PS**	**MM CP-3a** Paleontological Resources Monitoring and Mitigation Program: The Project Applicant shall retain the services of a qualified paleontological consultant having expertise in California paleontology to design and implement a Paleontological Resources Monitoring and Mitigation Program (PRMMP). The PRMMP shall include a description of when and where construction monitoring would be required; emergency discovery procedures; sampling and data recovery procedures; procedures for the preparation, identification, analysis, and curation of fossil specimens and data recovered; preconstruction coordination procedures; and procedures for reporting the results of the monitoring program. The PRMMP shall be consistent with the Society for Vertebrate Paleontology (SVP) Standard Guidelines for the mitigation of construction-related adverse impacts to paleontological resources and the requirements of the designated repository for any fossils collected. During construction, earth-moving activities shall be monitored by a qualified paleontological consultant having expertise in California paleontology in the areas where these activities have the potential to disturb previously undisturbed native sediment or sedimentary rocks. Monitoring need not be conducted in areas where the ground has been previously disturbed, in areas of artificial fill, in areas underlain by nonsedimentary rocks (serpentinite, greenstone), or in areas where exposed sediment would be buried, but otherwise undisturbed. The consultant's work shall be conducted in accordance with this measure and at the direction of the City's Environmental Review Officer (ERO). Plans and reports prepared by the consultant shall be submitted first and directly to the ERO for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Paleontological monitoring and/or data recovery programs required by this measure could suspend construction of the Project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce potential effects on a significant paleontological resource as previously defined to a less-than-significant level.	**LTS/M**
Impact CP-3b Construction at HPS Phase II would not result in a substantial adverse change in the significance of a paleontological resource.	**PS**	**MM CP-3a** would apply to this impact.	**LTS/M**
Impact CP-3c Construction of the Yosemite Slough bridge, shoreline improvements, and the marina improvements activities, including in-water activities, would not result in a substantial adverse change in the significance of a paleontological resource.	**PS**	**MM CP-3a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact CP-3d Pile driving associated with construction of the Yosemite Slough bridge, shoreline improvements, and the marina improvements would not result in a substantial adverse change in the significance of a paleontological resource.	**PS**	**MM CP-3a** would apply to this impact.	**LTS/M**
		SECTION III.K (HAZARDS AND HAZARDOUS MATERIALS)	
Impact HZ-1 Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with known contaminants from historic uses.	**PS**	**MM HZ-1a** and **MM HZ-1b** would apply to this impact.	**LTS/M**
● **Impact HZ-1a** Construction at Candlestick Point bayward of the historic high tide line would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with known contaminants from historic uses.	**PS**	**MM HZ-1a** Article 22A Site Mitigation Plans. (Applies only to Candlestick Point.) Prior to obtaining a site, building or other permit from the City for development activities involving subsurface disturbance at portions of Candlestick Point bayward of the high tide line, the Project Applicant shall comply with the requirements of San Francisco Health Code Article 22A. If the site investigation required by Article 22A (or, in the case of development activity in CPSRA, which is not subject to Article 22A, a comparable site investigation that is carried out to comply with this measure, and which involves notification to California State Parks if a site mitigation plan is prepared), indicates the presence of a hazardous materials release, a site mitigation plan must be prepared. The site mitigation plan must specify the actions that will be implemented to mitigate the significant environmental or health and safety risks caused or likely to be caused by the presence of the identified release of hazardous materials. The site mitigation plan shall identify, as appropriate, such measures as excavation, containment, or treatment of the hazardous materials, monitoring and follow-up testing, and procedures for safe handling and transportation of the excavated materials, or for protecting the integrity of the cover or for addressing emissions from remedial activities, consistent with the requirements set forth in Article 22A. To the extent that Article 22A does not apply to state-owned land at CPSRA, prior to undertaking subsurface disturbance activities at CPSRA, the Agency and the California Department of Parks and Recreation shall enter into an agreement to follow procedures equivalent to those set forth in Article 22A for construction and development activities conducted at Candlestick Point State Recreation Area.	**LTS/M**

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Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-1b Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with known contaminants from historic uses.	**PS**	**MM HZ-1b** Compliance with Requirements Imposed by Cleanup Decision Documents and Property Transfer Documents. (Applies only to HPS Phase II) Prior to obtaining a grading, excavation, site, building or other permit from the City for development activity at HPS Phase II involving subsurface disturbance, the Project Applicant shall submit documentation acceptable to the San Francisco Department of Public Health that the work will be undertaken in compliance with all notices, restrictions, and requirements imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOST, FOSET or FOSL, including notices, restrictions, and requirements imposed in deeds, covenants, leases, easements, and LIFOCs, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans, Community Involvement Plans, and health and safety plans. Such restrictions, imposed by federal and state regulatory agencies as a condition on the Navy transfer of the property to the Agency, will ensure that the property after transfer will be used in a manner that is protective of the environment and human health. The City/Agency may choose to implement this measure by requiring these actions as part of amendments to San Francisco Health Code Article 31, which currently sets forth procedural requirements for development in HPS Phase I, or through an equivalent process established by the City or Agency.	**LTS/M**
Impact HZ-2 Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with previously unidentified subsurface contaminants from historic uses.	**PS**	**MM HZ-2a.1** and **MM HZ-2a.2** would apply to this impact.	**LTS/M**
Impact HZ-2a Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with previously unidentified subsurface contaminants from historic uses.	**PS**	**MM HZ-2a.1** Unknown Contaminant Contingency Plan. (Applies to Candlestick Point, HPS Phase II, and off-site improvements.) Prior to obtaining the first site, building or other permit for development activities involving subsurface disturbance, the Project Applicant shall prepare and the San Francisco Department of Public Health shall approve a contingency plan to address unknown contaminants encountered during development activities. This plan, the conditions of which shall be incorporated into the first permit and any applicable permit thereafter, shall establish and describe procedures for implementing a contingency plan, including appropriate notification to nearby property owners, schools, and residents and appropriate site control procedures, in the event unanticipated subsurface hazards or hazardous material releases are discovered during construction. Control procedures would include, but would not be limited to, further investigation and, if necessary remediation of such hazards or releases, including off-site removal and disposal, containment or treatment. In the event unanticipated subsurface hazards or hazardous material releases are discovered during construction, the requirements of this unknown contaminant contingency plan shall be followed. The contingency plan shall be amended, as necessary, in the event new information becomes available that could affect the implementation of the plan. This measure	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b. **MM HZ-2a.2** Site-Specific Health and Safety Plans. (Applies to Candlestick Point, HPS Phase II, and off-site improvements.) Prior to obtaining the first site, building or other permit for the Project from the City for development activities involving subsurface disturbance, the Project Applicant shall prepare and submit to SFDPH a site-specific health and safety plan (HASP) in compliance with applicable federal and state OSHA requirements and other applicable laws to minimize impacts to public health and the environment. development of the plan shall be required as a condition of any applicable permit. The plan shall include identification of chemicals of concern, potential hazards, personal protective equipment and devices, and emergency response procedures. The HASP shall be amended, as necessary, in the event new information becomes available that could affect the implementation of the plan. This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b.	
Impact HZ-2b Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with previously unidentified subsurface contaminants from historic uses.	**PS**	**MM HZ-2a.1** and **MM HZ-2a.2** would apply to this impact.	**LTS/M**
Impact HZ-3 Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of off-site transport and disposal of contaminated soil and groundwater.	**PS**	**MM HZ-1b** and **MM HY-1a.3** would apply to this impact	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-3a Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of off-site transport and disposal of contaminated soil and groundwater.	**PS**	**MM HY-1a.3** would apply to this impact.	**LTS/M**
Impact HZ-3b Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of off-site transport and disposal of contaminated soil and groundwater.	**PS**	**MM HZ-1b** and **MM HY-1a.3** would apply to this impact	**LTS/M**
Impact HZ-4 Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of improvements to existing and installation of new underground utilities.	**PS**	**MM HZ-1a, MM HZ-1b, MM HZ-2a.1**, and **MM H2-2a.2** would apply to this impact.	**LTS/M**
Impact HZ-4a Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of improvements to existing and installation of new underground utilities.	**PS**	**MM HZ-1a** and **MM HZ-2a.1** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-4b Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of improvements to existing and installation of new underground utilities.	**PS**	**MM HZ-1b, MM HZ-2a.1**, and **MM HZ-2a.2** would apply to this impact.	**LTS/M**
Impact HZ-5 Construction activities associated with the Project would not create vertical conduits for hazardous materials that could contaminate groundwater as a result of installation of foundation support piles.	**PS**	**MM HZ-1a, MM HZ-1b** and **MM HZ-5a** would apply to this impact.	**LTS/M**
Impact HZ-5a Construction at Candlestick Point would not create vertical conduits for hazardous materials that could contaminate groundwater as a result of installation of foundation support piles.	**PS**	**MM HZ-5a** Foundation Support Piles Installation Plan. (Applies to Candlestick Point and HPS Phase II.) Prior to obtaining a permit from the City that authorizes installation of deep foundation piles, the Project Applicant shall prepare and submit a plan acceptable to the City stating that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. This measure shall be implemented for Candlestick Point through implementation of mitigation measure MM HZ-1a. This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b.	**LTS/M**
Impact HZ-5b Construction at HPS Phase II would not create vertical conduits for hazardous materials that could contaminate groundwater as a result of installation of foundation support piles.	**PS**	**MM HZ-1b** and **MM HZ-5a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-6 Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the handling, stockpiling, and transport of soil that may contain contaminants.	**PS**	**MM HZ-1a**, **MM HY-1a.2, MM HZ-1b,** and **MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact HZ-6a Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of handling, stockpiling, and transport of soil that may contain contaminants.	**PS**	**MM HZ-1a, MM HY-1a.2**, and **MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact HZ-6b Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of handling, stockpiling, and transport of soil that may contain contaminants.	**PS**	**MM HZ-1b, MM HZ-1a.2,** and **MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact HZ-7 Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials that could be present in stormwater runoff.	**PS**	**MM HZ-1a, MM HY-1a.2, MM HZ-1b, MM HZ-2a.1,** and **MM HY-1a.1** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-7a Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials that could be present in stormwater runoff.	**PS**	**MM HZ-1a, MM HY-1a.2, MM HZ-2a.1**, and **MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact HZ-7b Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials that could be present in stormwater runoff.	**PS**	**MM HZ-1b, MM HY-1a.2, MM HZ-2a.1**, and **MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact HZ-8 Project occupants or visitors in or near portions of HPS Phase II where remediation has not been fully completed would not be exposed to unacceptable levels of hazardous materials.	**PS**	**MM HZ-1b** and **MM HZ-12** would apply to this impact.	**LTS/M**
Impact HZ-9 Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of Yosemite Slough bridge construction.	**PS**	**MM HZ-9** Navy-approved workplans for construction and remediation activities on Navy-owned property. (Applies only to the portions of HPS Phase II on Navy-owned property). Construction activities and remediation activities conducted on behalf of the Agency or the Project Applicant, on Navy-owned property shall be conducted in compliance with all required notices, restrictions, or other requirements set forth in the applicable lease, easement, or license or other form of right of entry and in accordance with a Navy-approved workplan. This mitigation measure also requires that such activities be conducted in accordance with applicable health and safety plans, dust control plans, stormwater pollution prevention plans, community involvement plans, or any other documents or plans required under applicable law. The City/Agency will access Navy property through a lease, license, or easement. The City/Agency shall not undertake any activity or approve any Project Applicant activity on Navy-owned property until the Navy and other agencies with approval authority have approved a workplan for the activity. The requirement to comply with the approved work plans shall be incorporated into and made a condition of any City/Agency approvals related to activities on Navy property. This measure shall be implemented for HPS Phase II through a process established by the City or Agency as explained in MM HZ-1b.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-10 Construction activities associated with the Project in shoreline areas would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of sediment or soil that may contain chemical or radiological contaminants.	**PS**	**MM BI-4a.1, MM BI-4a.2, MM BI-5b.4, MM BI-12b.1, MM HY-1a.1, MM HY-1a.2, MM HZ-1a, MM HZ-2a.1**, and **MM HZ-10b** would apply to this impact	**LTS/M**
Impact HZ-10a Construction in the shoreline areas at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of sediment or soil that may contain chemical contaminants.	**PS**	**MM BI-4.a.1**, **MM BI-4.a.2**, **MM HY-1a.1**, **MM HY-1a.2**, **MM HZ-1a**, and **MM HZ-2a.1** would apply to this impact.	**LTS/M**
Impact HZ-10b Construction in the shoreline areas at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of sediment or soil that is radiologically affected or that may contain chemical contaminants.	**PS**	**MM HZ-10b** Regulatory Agency–Approved Workplans and Permits for Shoreline Improvements. Prior to undertaking any shoreline improvement activities that would affect sediment at HPS Phase II, the Agency or its contractor or Project Applicant shall prepare appropriate design documents and submit to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A Dredged Material Management Office (DMMO) permit shall be obtained. The design documents shall incorporate the necessary shoreline improvements required for each specific area (e.g., including, but not limited to, rock buttressing, pile replacement, backfilling, riprap, or installation of natural-looking shoreline protection using fill and ACB mats) such that remediation (removal of sediment and any necessary dredging) and structural improvements are performed under the same regulatory approvals and permits. Prior to undertaking any shoreline improvement activities that could affect contaminated sediments left in place and covered or capped with a Navy-installed remedial measure, or that would involve pile replacement in such areas, the Agency or its contractor or Project Applicant shall prepare appropriate design documents that: (1) describes how the cover or cap would be inspected to determine whether proposed shoreline improvements would adversely affect the cover or cap; and (2) describes how construction activities would be performed to mitigate environmental risk and to restore the cover or cap. The design documents shall be submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A DMMO permit shall be obtained, as applicable. Prior to undertaking any shoreline improvements that could encounter contaminated sediments, the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into the design documents, work	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent. This includes all restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans. Prior to obtaining a grading, excavation, site, building, or other permit from the City that authorizes remedial activities, SFDPH shall confirm that the work proposed complies with the applicable plans required by the Administrative Order of Consent. This measure shall be implemented through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b. **MM HZ-1b, MM HZ-12, MM HY-1a.1, MM HY-1a.2, MM B1-4a.1, MM BI-4a.2**, **MM BI-5b.4**, and **MM BI-12b.1** would also apply to this impact.	
Impact HZ-11 Construction activities associated with the Project on Navy-owned property, including improvements to existing utilities and installation of new underground utilities, would not expose occupants, construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, or groundwater that may contain contaminants from historic uses, including radiological contaminants.	**PS**	**MM HZ-1b** and **MM HZ-9** would apply to this impact.	**LTS/M**
● **Impact HZ-12** Remediation activities conducted on behalf of the City or Project Applicant at the HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would not expose remediation and construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater that may contain contaminants from historic uses.	**PS**	**MM HZ-12** Compliance with Administrative Order on Consent at Early Transferred Parcels. (Applies only at HPS Phase II.) Prior to undertaking any remediation activities at HPS Phase II on property that the Navy has transferred to the Agency as part of an early-transfer, the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, community involvement plans, and any other document or plan required under the Administrative Order of Consent. This includes all notices, restrictions, and requirements imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans, community involvement plans, and health and safety plans. Prior to obtaining a grading, excavation, site, building, or other permit from the City that authorizes remedial activities, SFDPH shall confirm that the work proposed complies with the applicable plans required by the Administrative Order on Consent. This measure shall be implemented through a requirement in the potential additions to Article 31 imposing requirements to parcels other than Parcel A or through an equivalent process established by the City or Agency.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-13 Construction of off-site roadway improvements would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil or groundwater that may contain contaminants.	**LTS**	No mitigation is required.	**LTS**
Impact HZ-14 Construction activities associated with the Project would not expose ecological receptors to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater with contaminants from historic uses.	**PS**	**MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-9, MM HZ-10b, MM HZ-12**, **MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2**, and **MM BI-12b.1** would apply to this impact.	**LTS/M**
Impact HZ-14a Construction at Candlestick Point would not expose ecological receptors to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater that may contain contaminants from historic uses.	**PS**	**MM HZ-1a**, **MM HZ-2a.1**, **MM HZ-15**, **MM HY-1a.1, MM HY-1a.2**, **MM HY-1a.3, MM BI-4a.1**, and **MM BI-4a.2** would apply to this impact.	**LTS/M**
Impact HZ-14b Construction at HPS Phase II would not expose ecological receptors to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater that may contain contaminants from historic uses.	**PS**	**MM HZ-1b, MM HZ-1a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2**, and **MM BI-12b.1** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-15 Construction and grading activities associated with the Project would not disturb soil or rock that could be a source of naturally occurring asbestos in a manner that would present a human health hazard.	**PS**	**MM HZ-15** Asbestos Dust Mitigation Plans and Dust Control Plans. Prior to obtaining a grading, excavation, site, building or other permit from the City that includes soil disturbance activities, the Project Applicant shall obtain approval of an Asbestos Dust Mitigation Plan (ADMP) from BAAQMD for areas over 1 acre that potentially contain naturally occurring asbestos and approval of a Dust Control Plan (DCP) from SFDPH for all areas at HPS Phase II and for areas over 0.5 acre at Candlestick Point. Compliance with the ADMP and DCP shall be required as a condition of the permit. The ADMP shall be submitted to and approved by the BAAQMD prior to the beginning of construction, and the Project Applicant must ensure the implementation of all specified dust control measures throughout the construction Project. The ADMP shall require compliance with the following specific control measures to the extent deemed necessary by the BAAQMD to meet its standard: ■ For construction activities disturbing less than one acre of rock containing naturally occurring asbestos, the following specific dust control measures must be implemented in accordance with the asbestos ATCM before construction begins and each measure must be maintained throughout the duration of the construction Project: > Limit construction vehicle speed at the work site to 15 miles per hour > Sufficiently wet all ground surfaces prior to disturbance to prevent visible dust emissions from crossing the property line > Keep all graded and excavated areas around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times per shift daily with reclaimed water during construction to prevent visible dust emissions from crossing the property line. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour > Adequately wet all storage piles, treat with chemical dust suppressants, or cover piles when material is not being added to or removed from the pile > Wash down all equipment before moving from the property onto a paved public road > Clean all visible track out from the paved public road by street sweeping or a HEPA filter equipped vacuum device within 24 hours ■ For construction activities disturbing greater than one acre of rock containing naturally occurring asbestos, construction contractors are required to prepare an ADMP specifying measures that will be taken to ensure that no visible dust crosses the property boundary during construction. The plan must specify the following measures, to the extent deemed necessary by the BAAQMD to meet its standard: > Prevent and control visible track out from the property onto adjacent paved roads. Sweep with reclaimed water at the end of each day if visible soil material is carried out from property > Ensure adequate wetting or covering of active storage piles	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

- Hydroseed or apply non-toxic soil stabilizers to disturbed surface areas and storage piles greater than ten cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil that will remain inactive for seven days or more.
- Control traffic on on-site unpaved roads, parking lots, and staging areas—including a maximum vehicle speed of 15 miles per hour or less
- Control earth moving activities
- Provide as much water as necessary to control dust (without creating run-off) in any area of land clearing, earth movement, excavation, drillings, and other dust-generating activity
- Control dust emissions from off-site transport of naturally occurring asbestos containing materials
- Stabilize disturbed areas following construction

If required by the BAAQMD, air monitoring shall be implemented to monitor for off-site migration of asbestos dust during construction activities, and appropriate protocols shall be established and implemented for notification of nearby schools, property owners, and residents when monitoring results indicate asbestos levels that have exceeded the standards set forth in the plan.

The DCP shall be submitted to and approved by the SFDPH prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust control measures throughout the construction Project. The DCP shall require compliance with the following specific mitigation measures to the extent deemed necessary by the SFDPH to achieve no visible dust at the property boundary:

- Submission of a map to the Director of Health showing all sensitive receptors within 1,000 feet of the site.
- Keep all graded and excavated areas, areas around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times per shift daily with reclaimed water during construction to prevent visible dust emissions from crossing the property line. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour
- Analysis of wind direction and placement of upwind and downwind particulate dust monitors.
- Record keeping for particulate monitoring results.
- Requirements for shutdown conditions based on wind, dust migration, or if dust is contained within the property boundary but not controlled after a specified number of minutes.
- Establishing a hotline for surrounding community members who may be potentially affected by Project-related dust. Contact person shall respond and take corrective action within 48 hours. Post publicly visible signs around the site with the hotline number as well as the phone number of the BAAQMD and make sure the numbers are given to adjacent residents, schools, and businesses.
- Limiting the area subject to construction activities at any one time.
- Installing dust curtains and windbreaks on windward and downwind sides of the property lines, as necessary. Windbreaks on windward side should have no more than 50% air porosity.

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Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Limiting the amount of soil in trucks hauling soil around the job site to the size of the truck bed and securing with a tarpaulin or ensuring the soil contains adequate moisture to minimize or prevent dust generation during transportation. ■ Enforcing a 15 mph speed limit for vehicles entering and exiting construction areas. ■ Sweeping affected streets with water sweepers at the end of the day. ■ Hiring an independent third party to conduct inspections for visible dust and keeping records of those inspections. ■ Minimizing the amount of excavated material or waste materials stored at the site. ■ Prevent visible track out from the property onto adjacent paved roads. Sweep with reclaimed water at the end of each day if visible soil material is carried out from property For all areas, this measure shall be implemented through Article 22B (areas over one half acre) or for HPS Phase II through a requirement in the potential additions to Article 31 imposing requirements to parcels other than Parcel A or through an equivalent process established by the City or Agency.	
Impact HZ-16 Construction activities associated with the Project would not result in a health hazard to construction workers, the public, or the environment as a result of the demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury.	**LTS**	No mitigation is required.	**LTS**
Impact HZ-16a Construction at Candlestick Point would not result in a health hazard to construction workers, the public, or the environment as a result of the demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-16b Construction at HPS Phase II would not result in a health hazard to construction workers, the public, or the environment as a result of the demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury.	**LTS**	No mitigation is required.	**LTS**
Impact HZ-17 Construction activities associated with the Project would not expose construction workers to unacceptable levels of hazardous materials in soil, sediment, or groundwater in a manner which would present a human health risk.	**PS**	**MM HZ-2a.2** would apply to this impact.	**LTS/M**
Impact HZ-17a Construction at Candlestick Point would not expose construction workers to unacceptable levels of hazardous materials in soil or groundwater in a manner which would present a human health risk.	**PS**	**MM HZ-2a.2** would apply to this impact.	**LTS/M**
Impact HZ-17b Construction at HPS Phase II would not expose construction workers to unacceptable levels of hazardous materials in soil, sediment, or groundwater in a manner which would present a human health risk.	**PS**	**MM HZ-2a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-18 Construction activities associated with the Project would not result in a human health risk involving the disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, or possible disturbance of contaminated soils or groundwater within one-quarter mile of an existing school.	**PS**	**MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2,** and **MM HZ-15** would apply to this impact.	**LTS/M**
Impact HZ-18a Construction at Candlestick Point would not result in a human health risk involving the disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, or possible disturbance of contaminated soils or groundwater within one-quarter mile of an existing school.	**PS**	**MM HZ 1a, HZ-2a.1, MM HZ-2a.2,** and **MM HZ-15** would apply to this impact.	**LTS/M**
Impact HZ-18b Construction at HPS Phase II would not result in a human health risk involving the disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, or possible disturbance of contaminated soils or groundwater within one-quarter mile of an existing school.	**PS**	**MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2**, and **MM HZ-15** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-19 Simultaneous construction activities at the Project site would not pose a human health risk from the release of contaminants from historic uses or fill.	**PS**	**MM HZ-1a, MM HZ-1b, MM HZ-9,** and **MM HZ-15** would apply to this impact.	**LTS/M**
Impact HZ-20 Construction activities associated with the Project would not result in adverse impacts to construction workers, visitors, or the environment from the routine use, storage, transportation, and disposal of hazardous materials.	**LTS**	No mitigation is required.	**LTS**
Impact HZ-21 Implementation of the Project would not result in adverse impacts to residents, visitors, or the environment from periodic maintenance requiring excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs.	**PS**	**MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-9,** and **MM HZ-12** would apply to this impact.	**LTS/M**
Impact HZ-21a Implementation of the Project at Candlestick Point would not result in adverse impacts to residents, visitors, or the environment from periodic maintenance requiring excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs.	**PS**	**MM HZ-1a**, **MM HZ-2a.1**, and **MM HZ-2a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-21b Implementation of the Project at HPS Phase II would not result in adverse impacts to residents, visitors, or the environment from periodic maintenance requiring excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs.	**PS**	**MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-9,** and **MM HZ-12** would apply to this impact.	**LTS/M**
Impact HZ-22 Implementation of the Project would not result in a significant impact involving the routine use, storage, transportation, and disposal of hazardous materials.	**LTS**	No mitigation is required.	**LTS**
Impact HZ-23 Implementation of the Project would not pose a human health risk and/or result in an adverse effect on the environment from reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	**LTS**	No mitigation is required.	**LTS**
Impact HZ-24 Areas designated for research and development uses within HPS Phase II would not pose a human health risk as a result of hazardous air emissions within one-quarter mile of a school.	**PS**	**MM AQ-6.1** and **MM AQ-6.2** would apply to this impact.	**LTS/M**
Impact HZ-25 The Project site is not within the San Francisco Airport Land Use Policy Plan and the Project would not result in a safety hazard for people residing or working in the Project site.	**NI**	No mitigation is required.	**NI**

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Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HZ-26 Implementation of the Project would not occur within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working in the Project site.	**NI**	No mitigation is required.	**NI**
Impact HZ-27 Implementation of the Project would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.L (GEOLOGY AND SOILS)	
Impact GE-1 Construction activities associated with the Project would not result in the loss of topsoil caused by soil erosion.	**PS**	**MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact GE-1a Construction at Candlestick Point, including the Yosemite Slough bridge, would not result in the loss of topsoil caused by soil erosion.	**PS**	**MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact GE-1b Construction at HPS Phase II would not result in the loss of topsoil caused by soil erosion.	**PS**	**MM HY-1a.1** would apply to this impact.	**LTS/M**
Impact GE-2 Construction activities associated with the Project would not result in damage to structures caused by settlement from lowering of groundwater levels.	**PS**	**MM GE-2a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact GE-2a Construction at Candlestick Point and the Yosemite Slough bridge would not result in damage to structures from settlement caused by lowering of groundwater levels.	**PS**	**MM GE-2a** Mitigation to Minimize Dewatering Impacts during Construction. Prior to the issuance of any permit for a construction activity that would involve dewatering that could affect structures on adjacent or nearby properties, the Applicant shall, in compliance with Section 1803.1 of the *San Francisco Building Code* (SFBC), include in the permit application methods and techniques to ensure that dewatering would not lower the water table such that unacceptable settlement (as determined by a California Certified Engineering Geologist [CEG] or California Registered Geotechnical Engineer [GE]) at adjacent or nearby properties would occur. Such methods and technologies shall be based on the specific conditions at the construction site and could include, but are not necessarily limited to, the following: ■ Excavating below the groundwater table in confined areas with steel sheet piling driven below the base elevation of the proposed excavation, installation of bracing to support the excavation walls as required and, if necessary, underpinning the foundations of adjacent structures. Subsequently, the excavation would be carried out and seepage that enters the dammed area would be pumped out. ■ Perform dewatering using methods such as wellpoint systems, drainage ditches, and sump pumps. The excavation or dewatering methods shall be monitored to detect ground settlement and to monitor individual dewatering activities in the vicinity of an excavation. Monitoring results shall be submitted to the San Francisco Department of Building Inspection (DBI). In the event of unacceptable ground movement, as determined by DBI inspections and/or the review of monitoring results, all excavation work shall cease and corrective measures (including, for example, different dewatering methods and/or ground stabilization methods) shall be determined by the Project CEG or GE and reviewed and approved by DBI. No construction permit involving dewatering would be issued until the Project CEG or GE and DBI have approved dewatering and/or ground stabilization methods. The Project CEG or GE shall implement the corrective measures and continue monitoring activities.	**LTS/M**
Impact GE-2b Construction at HPS Phase II would not result in damage to structures caused by settlement from lowering of groundwater levels.	**PS**	**MM GE-2a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact GE-3 Rock removal activities at the Alice Griffith Public Housing site and the Jamestown area would not result in damage to structures from vibration and/or settlement caused by the fracturing of bedrock for excavation.	**PS**	**MM GE-3** Mitigation to Minimize Rock Fragmentation Impacts during Construction. Prior to the issuance of any permit for a construction activity that would involve controlled rock fragmentation that could cause settlement or lateral movement of structures on adjacent or nearby properties, the Applicant shall, in compliance with Section 1803.1 of the *San Francisco Building Code* (SFBC), include in the permit application methods and techniques to ensure that controlled rock fragmentation would not cause unacceptable vibration and/or settlement or lateral movement of structures at adjacent or nearby properties. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the following: ■ Pre-excavation surveying of potentially affected structures. ■ Underpinning of foundations of potentially affected structures, as necessary. The excavation plan shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of an excavation. Monitoring results shall be submitted to DBI. In the event of unacceptable ground movement, as determined by DBI inspections, all excavation work shall cease and corrective measures shall be implemented. The controlled rock fragmentation program and ground stabilization measures shall be reevaluated and approved by the DBI.	**LTS/M**
Impact GE-4 Implementation of the Project would not expose people and structures to substantial adverse effects caused by seismically induced groundshaking.	**PS**	**MM GE-4a.1, MM GE-4a.2,** and **MM GE-4a.3** would apply to this impact.	**LTS/M**
Impact GE-4a Implementation of the Project at Candlestick Point, including the Yosemite Slough bridge and Alice Griffith Housing, would not expose people or structures to substantial adverse effects caused by seismically induced groundshaking.	**PS**	**MM GE-4a.1** Site-Specific Geotechnical Investigation with Seismic Analyses. Prior to the issuance of any building permits for the Project site: ■ The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A "Guidelines for Evaluating and Mitigating Seismic Hazards in California." In addition, all engineering practices and analyses of peak ground accelerations and structural design shall be consistent with SFBC standards to ensure that structures can withstand expected ground accelerations. The CEG or GE shall determine and DBI shall approve design requirements for foundations and all other improvements associated with the permit application. ■ DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods. ■ All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations. ■ The Project CEG or GE shall be responsible for ensuring compliance with these requirements. **MM GE-4a.2** Seismic Design Compliance Documentation. Prior to the issuance of building permits for the replacement of the Alice Griffith Public Housing site, the Applicant shall submit any and all seismic design compliance documentation to the HUD, as required by that agency. The Project Developer shall confirm, by copy of all documents submitted, including transmittal, compliance with this requirement to DBI. The Project California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE) shall be responsible for verifying Project compliance with this requirement. **MM GE-4a.3** Site-specific Seismic Analyses to Ensure Safety of Bridge Design. Prior to the issuance of any building permits for the Project site, the California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE) for the Project shall confirm that the design-level geotechnical investigation for the Yosemite Slough bridge is based on Caltrans specifications (*Bridge Design Specifications*, Section 20 of *Bridge Memos to Designers*, *Seismic Design Criteria* as previously described) and meets the San Francisco Department of Public Works Bureau of Engineering (BOE) requirements. The Project CEG or GE and California Registered Structural Engineer (SE) shall approve bridge design. No building permits shall be issued until the CEG or GE and SE verify that the Project's bridge design complies with all Caltrans specifications and BOE requirements.	
Impact GE-4b Implementation of the Project at HPS Phase II would not expose people and structures to substantial adverse effects caused by seismically induced groundshaking.	**PS**	**MM GE-4a.1** would apply to this impact.	**LTS/M**
Impact GE-5 Implementation of the Project would not expose people or structures to substantial adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement.	**PS**	**MM GE-4a.1, MM GE-4a.2, MM GE-4a.3**, and **MM GE-5a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact GE-5a Implementation of the Project at Candlestick Point, including the Alice Griffith Housing and Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement.	**PS**	**MM GE-5a** Site-Specific Geotechnical Investigation with Analyses of Liquefaction, Lateral Spreading and/or Settlement. Prior to issuance of building permits for the Project site: ■ The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A "Guidelines for Evaluating and Mitigating Seismic Hazards in California." In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure seismic stability, including reduction of potential liquefaction hazards. ■ DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods. ■ All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations. ■ The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce liquefaction hazards. The engineering design techniques to reduce liquefaction hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval, including, but not necessarily limited to: > Structural Measures o Construction of deep foundations, which transfer loads to competent strata beneath the zone susceptible to liquefaction, for critical utilities and shallow foundations o Structural mat foundations to distribute concentrated load to prevent damage to structures > Ground Improvement Measures o Additional over-excavation and replacement of unstable soil with engineering-compacted fill o Dynamic compaction, such as Deep Dynamic Compaction (DDC) or Rapid Impact Compaction (RIC), to densify loose soils below the groundwater table o Vibro-compaction, sometimes referred to as vibro-floatation, to densify loose soils below the groundwater table o Stone columns to provide pore pressure dissipation pathways for soil, compact loose soil between columns, and provide additional bearing support beneath foundations	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		○ Soil-cement columns to densify loose soils and provide additional bearing support beneath foundations ■ The Project CEG or GE shall be responsible for ensuring compliance with these requirements. **MM GE-4a.1**, **MM GE-4a.2**, and **MM GE-4a.3** would also apply to this impact.	
Impact GE-5b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement.	**PS**	**MM GE-4a.1** and **MM GE-5a** would apply to this impact.	**LTS/M**
Impact GE-6 Implementation of the Project would not expose people or structures to substantial adverse effects caused by seismically induced landslides.	**PS**	**MM GE-4a.2** and **MM GE-6a** would apply to this impact.	**LTS/M**
Impact GE-6a Implementation of the Project at Candlestick Point, including the Alice Griffith Housing, would not expose people or structures to substantial adverse effects caused by seismically induced landslides.	**PS**	**MM GE-6a** Site-Specific Geotechnical Investigation with Landslide Risk Analyses. Prior to issuance of building permits for the Project site: ■ The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A "Guidelines for Evaluating and Mitigating Seismic Hazards in California." In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure seismic stability, including reduction of potential landslide hazards. ■ DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations. ■ The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce landslide hazards. The engineering design techniques to reduce landslide hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of landslides and potentially unstable slopes and shall identify means to avoid the hazard or support the design of engineering procedures to stabilize the slopes, as required by Chapter 18 (Soils and Foundations) of the SFBC, as well as the procedures outlined in CGS Special Publication 117A. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project's slope-stability specifications, including the appropriate foundation designs for structures on slopes and which would be used by DBI to verify the applicability of the specifications. If the presence of unstable slopes is identified, appropriate support and protection procedures shall be designed and implemented to maintain the stability of slopes adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities at the Project site. These stabilization procedures, including, but not necessarily limited to, the following: > Retaining walls, rock buttresses, screw anchors, or concrete piers > Slope drainage or removal of unstable materials > Rockfall catch fences, rockfall mesh netting, or deflection walls > Setbacks at the toe of slopes > Avoidance of highly unstable areas ■ The Project CEG or GE shall be responsible for ensuring compliance with these requirements. **MM GE-4a.2** and **MM GE-6a** would also apply to this impact.	
Impact GE-6b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by seismically induced landslides.	**NI**	No mitigation is required.	**NI**
Impact GE-7 Implementation of the Project would not expose people or structures to substantial adverse effects caused by shoreline instability.	**PS**	**MM HY-12a.1** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact GE-7a Implementation of the Project at Candlestick Point would not expose people or structures to substantial adverse effects caused by shoreline instability.	**PS**	**MM HY-12a.1** would apply to this impact.	**LTS/M**
Impact GE-7b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by shoreline instability.	**PS**	**MM HY-12a.1** would apply to this impact.	**LTS/M**
Impact GE-8 Implementation of the Project would not expose people or structures to substantial adverse effects caused by landslides.	**PS**	**MM GE-6a** would apply to this impact.	**LTS/M**
Impact GE-8a Implementation of the Project at Candlestick Point would not expose people or structures to substantial adverse effects caused by landslides.	**PS**	**MM GE-6a** would apply to this impact.	**LTS/M**
Impact GE-8b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by landslides.	**PS**	**MM GE-6a** would apply to this impact.	**LTS/M**
Impact GE-9 Implementation of the Project would not expose people or structures to substantial adverse effects caused by damage from settlement.	**PS**	**MM GE-4a.2, MM GE-4a.3**, and **MM GE-5a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact GE-9a Implementation of the Project at Candlestick Point, including Alice Griffith Housing and the Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by damage from settlement.	**PS**	**MM GE-4a.2**, **MM GE-4a.3,** and **MM GE-5a** would apply to this impact.	**LTS/M**
Impact GE-9b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by damage from settlement.	**PS**	**MM GE-5a** would apply to this impact.	**LTS/M**
Impact GE-10 Implementation of the Project would not expose people or structures to substantial adverse effects caused by expansive soils.	**PS**	**MM GE-4a.1**, **MM GE-4a.2, GE-4a.3,** and **MM GE-10a** would apply to this impact.	**LTS/M**
Impact GE-10a Implementation of the Project at Candlestick Point, including Alice Griffith Housing and the Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by expansive soils.	**PS**	**MM GE-10a** Site-Specific Geotechnical Investigation with Expansive Soils Analyses. Prior to issuance of building permits for the Project site: ■ The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC). In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure soils stability, including reduction of potential soil expansion hazards. ■ DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods. ■ All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce expansive soils hazards. The engineering design techniques to reduce expansive soils hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of expansive soils and potentially unstable soils and shall identify means to avoid the hazard or support the design of engineering procedures to stabilize the soils, as required by Chapter 18 (Soils and Foundations) of the SFBC. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project's soil-stability specifications, including the appropriate foundation designs for structures on expansive soils and which would be used by DBI to verify the applicability of the specifications. If the presence of expansive soils is identified, appropriate support and protection procedures shall be designed and implemented to maintain the stability of soils adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities at the Project site. ■ The Project CEG or GE shall be responsible for ensuring compliance with these requirements. **MM GE-4a.2,** and **MM GE-4a.3** would also apply to this impact.	
Impact GE-10b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by expansive soils.	**PS**	**MM GE-10a** would apply to this impact.	**LTS/M**
Impact GE-11 Implementation of the Project would not expose people or structures to substantial adverse effects caused by corrosive soils.	**PS**	**MM GE-4a.2**, **MM GE-4a.3**, and **MM GE-11a** would apply to this impact.	**LTS/M**
Impact GE-11a Implementation of the Project at Candlestick Point, including Alice Griffith Housing and the Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by corrosive soils.	**PS**	**MM GE-11a** Site-Specific Geotechnical Investigation with Corrosive Soils Analyses. Prior to issuance of building permits for the Project site: ■ The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC). In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure soils stability, including reduction of potential hazards from corrosive soils. ■ DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation,	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods. ■ All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations. ■ The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce potential hazards from corrosive soils. The engineering design techniques to reduce corrosive soils hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of corrosive soils and shall identify means to avoid the hazard, as required by Chapter 18 (Soils and Foundations) of the SFBC. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project's structural design specifications, including the appropriate foundation designs for structures on corrosive soils and which would be used by DBI to verify the applicability of the specifications. If the presence of corrosive soils is identified, appropriate protection procedures shall be designed and implemented to minimize potential for damage from corrosive soils to structures and facilities at the Project site. ■ The Project CEG or GE shall be responsible for ensuring compliance with these requirements. **MM GE-4a.2** and **MM GE-4a.3** would also apply to this impact.	
Impact GE-11b Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by corrosive soils.	**PS**	**MM GE-11a** would apply to this impact.	**LTS/M**
Impact GE-12 Implementation of the Project would not expose people or structures to substantial adverse effects caused by surface fault rupture.	**NI**	No mitigation is required.	**NI**
Impact GE-13 Implementation of the Project would not result in the use of soils incapable of adequately supporting septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	**NI**	No mitigation is required.	**NI**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact GE-14 Implementation of the Project would not result in a substantial change of topography or destruction of unique geologic features.	**NI**	No mitigation is required.	**NI**
		SECTION III.M (HYDROLOGY AND WATER QUALITY)	
Impact HY-1 Construction activities associated with the Project would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements.	**PS**	**MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM BI-4a.1, MM HZ-12, MM HZ-15, MM HZ-10b, MM BI-4a.2, MM BI-5b.4, MM BI-12b.1, MM BI-12b.2, MM HZ-1a, MM HZ-2a.1,** and **MM HZ-9** would apply to this impact.	**LTS/M**
Impact HY–1a Construction at Candlestick Point would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements.	**PS**	**MM HY-1a.1** Storm Water Pollution Prevention Plan: Combined Storm Sewer System. In compliance with the Article 4.1 of the Public Works Code and the City's Construction Site Water Pollution Prevention Program, the Project Applicant shall submit a site-specific Storm Water Pollution Prevention Plan (SWPPP) to the SFPUC for approval, prior to initiating construction activities in areas draining to the combined sewer system. The SFPUC requires implementation of appropriate Best Management Practices (BMPs) from the California Stormwater Quality Association Stormwater BMP Handbook- Construction or the Caltrans Construction Site BMPs Manual. In accordance with SFPUC's requirements, the SWPPP shall include: ■ An Erosion and Sediment Control Plan that includes a site map illustrating the BMPs that will be used to minimize on-site erosion and the sediment discharge into the combined sewer system, and a narrative description of those BMPs. Appropriate BMPs for Erosion and Sediment Control Plan may include: > Scheduling—Develop a schedule that includes sequencing of construction activities with the implementation of appropriate BMPs. Perform construction activities and control practices in accordance with the planned schedule. Schedule work to minimize soil-disturbing activities during the rainy season. Schedule major grading operations for the dry season when practical. Monitor the weather forecast for rainfall and adjust the schedule as appropriate. > Erosion Control BMPs—Preserve existing vegetation where feasible, apply mulch or hydroseed areas with native, non-invasive species, until permanent stabilization is established, and use soil binders, geotextiles and mats, earth dikes and drainage swales, velocity dissipation devices, slope drains, or polyacrylamide to protect soil from erosion. > Wind Erosion BMPs—Apply water or other dust palliatives to prevent dust nuisance; prevent overwatering which can cause erosion. Alternatively, cover small stockpiles or areas that remain inactive for seven or more days.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

> Sediment Control BMPs—Install silt fences, sediment basins, sediment traps, check dams, fiber rolls, sand or gravel bag barriers, straw bale barriers, approved chemical treatment, and storm drain inlet protection to minimize the discharge of sediment. Employ street sweeping to remove sediment from streets.

> Tracking Controls—Stabilize the construction site entrance to prevent tracking of sediment onto public roads by construction vehicles. Stabilize on-site vehicle transportation routes immediately after grading to prevent erosion and control dust. Install a tire wash area to remove sediment from tires and under carriages.

- Non-Stormwater Management BMPs that may include water conservation practices; dewatering practices that minimize sediment discharges; and BMPs for: paving and grinding activities; identifying illicit connections and illegal dumping; irrigation and other planned or unplanned discharges of potable water; vehicle and equipment cleaning, fueling, and maintenance; concrete curing and finishing; temporary batch plants; implementing shoreline improvements and working over water. Discharges from dewatering activities shall comply with the SFPUC's Batch Wastewater Discharge Requirements that regulate influent concentrations for various constituents.
- Waste Management BMPs shall be implemented for material delivery, use, and storage; stockpile management; spill prevention and control; solid and liquid waste management; hazardous waste management; contaminated soil management; concrete waste management; and septic/sanitary waste management.
- SWPPP Training Requirements—Construction personnel will receive training on the SWPPP and BMP implementation.
- Site Inspections and BMP Maintenance—An inspector identified in the SWPPP will inspect the site on a regular basis, before and after a storm event, and once each 24-hour period during extended storms to identify BMP effectiveness and implement corrective actions if required. The SWPPP shall include checklists that document when the inspections occurred, the results of the inspection, required corrective measures, and when corrective measures were implemented. Required BMP maintenance related to a storm event shall be completed within 48 hours of the storm event.

MM HY-1a.2 Stormwater Pollution Prevention Plan: Separate Storm Sewer System. Consistent with the requirements of the SWRCB General Permit for Storm Water Discharges Associated with Construction and Land Disturbing Activities (Construction General Permit), the Project Applicant shall undertake the proposed Project in accordance with a project-specific Storm Water Pollution Prevention Plan (SWPPP) prepared by Qualified SWPPP Developer, who shall consult with California State Parks on those elements of the SWPPP that cover the Candlestick Park State Recreation Area, including selection of best management practices and other SWPPP improvements. The SFRWQCB, the primary agency responsible for protecting water quality within the project area, is responsible for reviewing and ensuring compliance with the SWPPP. This review is based on the Construction General Permit issued by the SWRCB.

The SWPPP shall include, as applicable, all Best Management Practices (BMPs) required in Attachment C of the Construction General Permit for Risk Level 1 dischargers, Attachment D for Risk Level 2 dischargers, or

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		Attachment E for Risk Level 3 dischargers. In addition, recommended BMPs, subject to review and approval by the SFRWQCB, include the measures listed below. However, the measures themselves may be altered, supplemented, or deleted during the SFRWQCB's review process, since the SFRWQCB has final authority over the terms of the SWPPP. ■ Scheduling: > To reduce the potential for erosion and sediment discharge, schedule construction to minimize ground disturbance during the rainy season. Schedule major grading operations during the dry season when practical, and allow enough time before rainfall begins to stabilize the soil with vegetation or to install sediment-trapping devices. > Sequence construction activities to minimize the amount of time that soils remain disturbed. > Stabilize all disturbed soils as soon as possible following the completion of ground disturbing work. > Install erosion and sediment control BMPs prior to the start of any ground-disturbing activities. ■ Erosion and Sedimentation: > Preserve existing vegetation in areas where no construction activity is planned or where construction activity will occur at a later date. > Stabilize and re-vegetate disturbed areas as soon as possible after construction with planting, seeding, and/or mulch (e.g., straw or hay, erosion control blankets, hydromulch, or other similar material) except in actively cultivated areas. Planting and seeding shall use native, non-invasive species. > Install silt fences, coir rolls, and other suitable measures around the perimeter of the areas affected by construction and staging areas and around riparian buffers, storm drains, temporary stockpiles, spoil areas, stream channels, swales, down-slope of all exposed soil areas, and in other locations determined necessary to prevent off-site sedimentation. > Install temporary slope breakers during the rainy season on slopes greater than 5 percent where the base of the slope is less than 50 feet from a water body, wetland, or road crossing at spacing intervals required by the SFRWQCB. > Use filter fabric or other appropriate measures to prevent sediment from entering storm drain inlets. > Detain and treat stormwater using sedimentation basins, sediment traps, baker tanks, or other measures to ensure that discharges to receiving waters meet applicable water quality objectives. > Install check dams, where applicable, to reduce flow velocities. Check dams reduce erosion and allow sediment to settle out of runoff. > Install outlet protection/energy dissipation, where applicable, to prevent scour of the soil caused by concentrated high velocity flows. > Implement control measures such as spraying water or other dust palliatives to alleviate nuisance caused by dust.	

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Groundwater/Dewatering: > Prepare a dewatering plan prior to excavation specifying methods of water collection, transport, treatment, and discharge of all water produced by construction site dewatering. > Impound water produced by dewatering in sediment retention basins or other holding facilities to settle the solids and provide other treatment as necessary prior to discharge to receiving waters. Locate sedimentation basins and other retention and treatment facilities away from waterways to prevent sediment-laden water from reaching streams. > Control discharges of water produced by dewatering to prevent erosion. > If contaminated groundwater is encountered, contact the SFRWQCB for appropriate disposal options. Depending on the constituents of concern, such discharges may be disallowed altogether, or require regulation under a separate general or individual permit that would impose appropriate treatment requirements prior to discharge to the stormwater drainage system. ■ Tracking Controls: > Grade and stabilize construction site entrances and exits to prevent runoff from the site and to prevent erosion. > Install a tire washing facility at the site access to allow for tire washing when vehicles exit the site. > Remove any soil or sediment tracked off paved roads during construction by street sweeping. ■ Non-stormwater Controls: > Place drip pans under construction vehicles and all parked equipment. > Check construction equipment for leaks regularly. > Wash construction equipment in a designated enclosed area regularly. > Contain vehicle and equipment wash water for percolation or evaporative drying away from storm drain inlets. > Refuel vehicles and equipment away from receiving waters and storm drain inlets, contain the area to prevent run-on and run-off, and promptly cleanup spills. > Cover all storm drain inlets when paving or applying seals or similar materials to prevent the discharge of these materials. ■ Waste Management and Hazardous Materials Pollution Control: > Remove trash and construction debris from the project area daily. > Locate sanitary facilities a minimum of 300 feet from receiving waters. Maintain sanitary facilities regularly. > Store all hazardous materials in an area protected from rainfall and stormwater run-on and prevent the off-site discharge of hazardous materials.	

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

- > Minimize the potential for contamination of receiving waters by maintaining spill containment and cleanup equipment on site, and by properly labeling and disposing of hazardous wastes.
- > Locate waste collection areas close to construction entrances and away from roadways, storm drains, and receiving waters.
- > Inspect dumpsters and other waste and debris containers regularly for leaks and remove and properly dispose of any hazardous materials and liquid wastes placed in these containers.
- > Train construction personnel in proper material delivery, handling, storage, cleanup, and disposal procedures.
- > Implement construction materials management BMPs for:
- > Road paving, surfacing and asphalt removal activities.
- > Handling and disposal of concrete and cement.

■ BMP Inspection, Maintenance, and Repair:

- > Inspect all BMPs on a regular basis to confirm proper installation and function. Inspect BMPs daily during storms.
- > Immediately repair or replace BMPs that have failed. Provide sufficient devices and materials (e.g., silt fence, coir rolls, erosion blankets, etc.) throughout project construction to enable immediate corrective action for failed BMPs.

■ Monitoring and Reporting:

- > Provide the required documentation for SWPPP inspections, maintenance, and repair requirements. Personnel that will perform monitoring and inspection activities shall be identified in the SWPPP.
- > Maintain written records of inspections, spills, BMP-related maintenance activities, corrective actions, and visual observations of off-site discharges of sediment or other pollutants, as required by the SFRWQCB.
- > Monitor the water quality of discharges from the site to assess the effectiveness of control measures.

■ Implement Shoreline Improvements and work over water BMPs to minimize the potential transport of sediment, debris, and construction materials to the Lower Bay during construction of shoreline improvements.

■ Post-construction BMPs:

- > Re-vegetate all temporarily disturbed areas as required after construction activities are completed. Re-vegetation shall use native, non-invasive species.
- > Remove any remaining construction debris and trash from the project site and area upon project completion.
- > Phase the removal of temporary BMPs as necessary to ensure stabilization of the site.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

> Maintain post-construction site conditions to avoid formation of unintended drainage channels, erosion, or areas of sedimentation.

> Correct post-construction site conditions as necessary to comply with the SWPPP and any other pertinent SFRWQCB requirements.

- Train construction site personnel on components of the SWPPP and BMP implementation. Train personnel that will perform inspection and monitoring activities.

MM HY-1a.3 Groundwater Dewatering Plan. Prior to commencement of construction activities and to minimize potential impacts to receiving water quality during the construction period, the Project Applicant shall through the proper implementation of this dewatering plan, show compliance with SFRWQCB/NPDES requirements, whichever are applicable.

The Dewatering Plan shall specify how the water would be collected, contained, treated, monitored, and/or discharged to the vicinity drainage system or Lower Bay. Subject to the review and approval of the SFRWQCB, the Dewatering Plan shall include, at a minimum:

- Identification of methods for collecting and handling water on site for treatment prior to discharge, including locations and capacity of settling basins, infiltration basins (where not restricted by site conditions), treatment ponds, and/or holding tanks
- Identification of methods for treating water on site prior to discharge, such as filtration, coagulation, sedimentation settlement areas, oil skimmers, pH adjustment, and other BMPs
- Procedures and methods for maintaining and monitoring dewatering operations to ensure that no breach in the process occurs that could result in an exceedance of applicable water quality objectives
- Identification of discharge locations and inclusion of details on how the discharge would be conducted to minimize erosion and scour
- Identification of maximum discharge rates to prevent exceedance of storm drain system capacities
- Additional requirements of the applicable General Permit or NPDES Permit/WDR (including effluent and discharge limitations and reporting and monitoring requirements, as applicable) shall be incorporated into the Dewatering Plan

Any exceedance of established narrative or numeric water quality objectives shall be reported to the SFRWQCB and corrective action taken as required by the SFRWQCB and the Dewatering Plan. Corrective action may include increased residence time in treatment features (e.g., longer holding time in settling basins) and/or incorporation of additional treatment measures (e.g., addition of sand filtration prior to discharge).

MM HZ-1a, **MM HZ-2a.1**, **MM HZ-5a, MM HZ-15**, **MM BI-4a.1,** and **MM BI-4a-2** would also apply to this impact.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HY-1b Construction at HPS Phase II would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements.	**PS**	**MM HY-1a.1, MM HY-1a.2**, **MM HY-1a.3**, **MM HZ-1a**, **MM HZ-2a.1**, **MM HZ-5a**, **MM HZ-10b**,**MM HZ-12, MM HZ-15, MM BI-4a.1**, **MM BI-4a.2**, **MM BI-5b.4**, **MM BI-12b.1**, and **MM BI 12b.2** would apply to this impact.	**LTS/M**
Impact HY-1c Construction of the Yosemite Slough bridge would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements.	**PS**	**MM HY-1a1, MM HY-1a.2, MM HZ-1a, MM HZ-2a.1, MM HZ-9, MM BI-4a.1, MM BI-4a.2; MM BI-12b.1**, and **MM BI-12b.2** would apply to this impact.	**LTS/M**
Impact HY-2 Construction activities associated with the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	**LTS**	No mitigation is required.	**LTS**
Impact HY-3 Construction activities associated with the Project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HY-4 Construction activities associated with the Project would not substantially alter the existing drainage pattern of the site, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site.	**PS**	**MM HY-1a.1, MM HY-1a.2,** and **MM HY-1a.3** would apply to this impact.	**LTS/M**
Impact HY-5 Construction activities associated with the Project would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff.	**PS**	**MM HY-1a.2** would apply to this impact.	**LTS/M**
Impact HY-6 Implementation of the Project would not contribute to violations of water quality standards or waste discharge requirements.	**PS**	**MM HY-6a.1, MM HY-6a.2, MM HY-6b.1, MM HY-6b.2, MM HY-6b.3, MM BI-18b.1, MM BI-18b.2, MM BI-19b.1,** and **MM BI-19b.2** would apply to this impact.	**LTS/M**
Impact HY-6a Implementation of the Project at Candlestick Point would not contribute to violations of water quality standards or waste discharge requirements.	**PS**	**MM HY-6a.1** Regulatory Stormwater Requirements. The Project Applicant shall comply with requirements of the Municipal Stormwater General Permit and associated City SWMP, appropriate performance standards established in the Green Building Ordinance, and performance standards established by the SFPUC in the San Francisco Stormwater Design Guidelines. The Draft San Francisco Stormwater Design Guidelines have been developed to satisfy the Municipal Stormwater General Permit requirements for new development and redevelopment projects in areas served by separate storm sewers, and are expected to be adopted by December 2009. The Project Applicant shall comply with requirements of the Draft San Francisco Stormwater Design Guidelines. Upon adoption of the Final Stormwater Design Guidelines, the Project shall comply with the Final San Francisco Stormwater Design Guidelines unless discretionary permits have been approved. Per the Draft San Francisco Stormwater Design Guidelines, the Project Applicant shall submit a SCP to the SFPUC, as part of the development application submitted for approval. The SCP shall demonstrate how the following measures would be incorporated into the Project: ■ Low impact development site design principles (e.g., preserving natural drainage channels, treating stormwater runoff at its source rather than in downstream centralized controls)	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

- Source control BMPs in the form of design standards and structural features for the following areas, as applicable:
  - Commercial areas
  - Restaurants
  - Retail gasoline outlets
  - Automotive repair shops
  - Parking lots
- Source control BMPs for landscaped areas shall be documented in the form of a Landscape Management Plan that relies on Integrated Pest Management and also includes pesticide and fertilizer application guidelines.
- Treatment control measures (e.g., bioretention, porous pavement, vegetated swales) targeting the Project-specific COCs: sediment, pathogens, metals, nutrients (nitrogen and phosphorus compounds), oxygen-demanding substances, organic compounds (e.g., PCBs, pesticides), oil and grease, and trash and debris. The SCP shall demonstrate that the Project has the land area available to support the proposed BMP facilities sized per the required water quality design storm. Volume-based BMPs shall be sized to treat runoff resulting from 0.75 inches of rainfall (LEED® SS6.2), and flow-based BMPs shall be sized to treat runoff resulting from a rainfall intensity of 0.2 inches per hour. Treatment trains shall be used where feasible.

Additional requirements:

- LEED® SS6.2: BMPs used to treat runoff shall be designed to remove 80 percent of the average annual post-development total suspended solids loads. BMPs are considered to meet these criteria if they are designed in accordance with SFPUC requirements.
- The SCP shall include an Operations and Maintenance Plan that demonstrates how the treatment control BMPs would be maintained in the long term, what entities would be responsible for BMP maintenance within the public and private rights-of-way, funding mechanisms, and what mechanisms would be used to formalize maintenance and access agreements.
- The Project Applicant shall also prepare a Stormwater Drainage Master Plan (SDMP) for approval by the SFPUC. The SDMP shall include plans for the storm drain infrastructure and plans for stormwater management controls (e.g., vegetated swales, dry wells). The storm drain infrastructure shall illustrate conveyance of the 5-year storm event in a separate storm drain piped system, and conveyance of the 100-year storm event in the street and drainage channel rights-of-way.

MM HY-6a.2 Recycled Water Irrigation Requirements. Prior to application of recycled water at the Project site for landscape irrigation, the Project Applicant shall demonstrate compliance with all terms and conditions of the SFPUC's Operations and Maintenance Plan and the Recycled Water General Permit conditions for the use of recycled water. As required by the Recycled Water General Permit, the Project Applicant shall submit an Operations and Maintenance Plan and an Irrigation Management Plan to the SWRCB. The Project Applicant shall also submit the Operations and Maintenance Plan and the Irrigation Management Plan to the SFPUC. Prior to

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		on-site application of recycled water, the Project Applicant shall obtain written confirmation from the SFPUC that the Project Operations and Maintenance Plan and the Irrigation Management Plan is in compliance with the SFPUC's Operations and Maintenance Plan, and other SFPUC requirements for the use of recycled water. All recycled water provided to Project Applicant, pursuant to the Recycled Water General Permit, shall be treated in and managed in conformance with all applicable provisions of the Recycled Water Policy and shall meet Title 22 Requirements for disinfected tertiary recycled water as described in CCR Title 22, sections 60301.230 and 60301.320. In accordance with the Recycled Water General Permit, the Project Applicant's Operations and Maintenance Plan shall describe methods and procedures for complying with recycled water regulations, and the maintenance of equipment and emergency backup systems to maintain compliance with the General Permit conditions and California Department of Public Health (CDPH) requirements. The Project Applicant shall ensure that all users of recycled water comply with the Operations and Maintenance Plan by developing educational materials (e.g., pamphlet or brochure) that convey key operational elements (e.g., prevention of cross-connections) of the plan. In accordance with the Recycled Water General Permit, the Project Applicant's Irrigation Management Plan shall include measures to ensure the use of recycled water occurs at an agronomic rate while employing practices to minimize application of salinity constituents. The Irrigation Management Plan shall account for soil characteristics, recycled water characteristics, plant species irrigation requirements, climatic conditions, supplemental nutrient additions to support plant growth, and management of impoundments used to store or collect recycled water. The Irrigation Management Plan shall describe any conditions of approval required by the City, CDPH, or SWRCB. The Project Applicant shall implement the following landscape irrigation BMPs in accordance with Recycled Water General Permit Requirements: ■ The Operations and Maintenance Plan shall include leak detection methods and correction within 72 hours of identifying a leak or prior to the release of 1,000 gallons. ■ Recycled water shall not be applied during precipitation events. ■ Impoundment areas shall be managed such that no discharge occurs from storms smaller than the 25-year, 24-hour event. The Project Applicant shall also implement BMPs for general operational controls, protection of workers and the public (e.g., education about not drinking recycled water), and efficient irrigation (e.g., dedicated landscape water meters for monitoring water usage and leak detection). The Project Applicant shall conduct monthly monitoring to quantify the volume of recycled water applied, the locations and total area of application, and the mass of nitrogen and salinity constituents applied. **MM HZ-1a** and **MM HZ-2a.1** would also apply to this impact.	

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HY-6b Implementation of the Project at HPS Phase II would not contribute to violations of water quality standards or waste discharge requirements.	**PS**	**MM HY-6b.1** Limitations on Stormwater Infiltration. Infiltration BMPs on HPS Phase II shall be prohibited. Alternative BMPs for stormwater quality control, reuse, and treatment shall be used. For instance, biofiltration BMPs can be implemented with an impervious liner and subdrain system to treat stormwater runoff while preventing infiltration. Overland flow (greater than the five-year and up to the 100-year storm) shall be conveyed in lined channels or other conveyances that will not result in infiltration. **MM HY-6b.2** Industrial General Permit. The Facility Operator shall apply for an Industrial General Permit prior to operational activities for facilities requiring coverage under the Industrial General Permit, which is determined based on the facility's SIC. The Facility Operator shall comply with all provisions in the Industrial General Permit, including implementation of a SWPPP, to effectively control pollutants to the BAT/BCT during the normal course of operations. Primary components and pollution prevention measures that the SWPPP shall address are described below. The Facility Operator shall refer to the California Stormwater Quality Association Stormwater Best Management Practice Handbook – Industrial and Commercial or equivalent for details on BMP implementation. The SFRWQCB is responsible for overseeing Industrial General Permit activities, including SWPPP compliance. The following BMPs shall be incorporated into the SWPPP. Non-Structural BMPs ■ Good Housekeeping: Good housekeeping generally consists of practical procedures to maintain a clean and orderly facility. ■ Preventive Maintenance: Regular inspection and maintenance of structural stormwater controls (catch basins, oil/water separators, etc.) as well as other facility equipment and systems. ■ Spill Response: Spill clean-up procedures and necessary clean-up equipment based upon the quantities and locations of significant materials that may spill or leak. ■ Material Handling and Storage: Procedures to minimize the potential for spills and leaks and to minimize exposure of significant materials to stormwater and authorized non-stormwater discharges. ■ Employee Training: Training of personnel who are responsible for (1) implementing activities identified in the SWPPP, (2) conducting inspections, sampling, and visual observations, and (3) managing stormwater. The SWPPP shall identify periodic dates for such training. Records shall be maintained of all training sessions held. ■ Waste Handling/Recycling: Procedures or processes to handle, store, or dispose of waste materials or recyclable materials. ■ Recordkeeping and Internal Reporting: Procedures to ensure that all records of inspections, spills, maintenance activities, corrective actions, visual observations, etc., are developed, retained, and provided, as necessary, to the appropriate facility personnel. ■ Erosion Control and Site Stabilization: This may include the planting and maintenance of vegetation, diversion of run-on and runoff, placement of sandbags, silt screens, or other sediment control devices, etc.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Inspections: This includes, in addition to the preventative maintenance inspections identified above, an inspection schedule of all potential pollutant sources. Tracking and follow-up procedures shall be described to ensure adequate corrective actions are taken and SWPPP revisions are made as needed. ■ Quality Assurance: Procedures to ensure that all elements of the SWPPP and Monitoring Program are adequately conducted. <u>Structural BMPs to be Considered</u> ■ Overhead Coverage: Structures that provide horizontal coverage of materials, chemicals, and pollutant sources from contact with stormwater and authorized non-stormwater discharges. ■ Retention Ponds: Basins, ponds, surface impoundments, etc. that do not allow stormwater to discharge from the facility. ■ Control Devices: Berms or other devices that channel or route run-on and runoff away from pollutant sources. ■ Secondary Containment Structures: This generally includes containment structures around storage tanks and other areas for the purpose of collecting any leaks or spills. ■ Treatment: This includes inlet controls, infiltration devices, oil/water separators, detention ponds, vegetative swales, etc. that reduce the pollutants in stormwater discharges and authorized non-stormwater discharges. However, because of extensive site constraints, use of infiltration BMPs shall be limited. **MM HY-6b.3** <u>Clean Marinas California Program.</u> The marina operator shall obtain certification under the Clean Marinas California Program. The Clean Marinas California Program has developed marina BMPs and an inspection and certification process for marinas that meet the program standard for BMP implementation. The marina operator shall implement BMPs that address the following sources of pollution: petroleum containment, topside boat maintenance and cleaning, underwater boat hull cleaning, marina operations, marina debris, boat sewage discharge, solid waste, liquid waste, fish waste, hazardous materials, and stormwater runoff. **MM HY-6a.1, MM HY-6a.2 MM HZ-1b, MM HZ-2a.1, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM BI-18b.1, MM BI-18b.2, MM BI-19b.1,** and **MM BI-19b.2** would also apply to this impact.	
Impact HY-6c Implementation of the Yosemite Slough bridge would not contribute to violations of water quality standards or waste discharge requirements.	**LTS**	No mitigation is required.	**LTS**
Impact HY-7 Implementation of the Project would not otherwise degrade water quality.	**PS**	**MM HY-6a.1, MM HY-6a.2**, and **MM HY-6b.1** would apply to this impact.	**LTS/M**

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Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HY-8 Implementation of the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	**NI**	No mitigation is required.	**NI**
Impact HY-9 Implementation of the Project would not alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, and would not result in substantial erosion or siltation on site or off site.	**PS**	**MM HY-6a.1** would apply to this impact.	**LTS/M**
Impact HY-10 Implementation of the Project would not alter the existing drainage pattern of the site, through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff, and would not result in flooding on site or off site.	**PS**	**MM HY-6a.1** would apply to this impact.	**LTS/M**
Impact HY-11 Implementation of the Project would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff.	**PS**	**MM HY-6a.1** would apply to this impact.	**LTS/M**
Impact HY–12 Implementation of the Project would not place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	**PS**	**MM HY-12a.1** and **MM HY-12a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HY-12a Implementation of the Project at Candlestick Point would not place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	**PS**	**MM HY-12a.1** Finished Grade Elevations Above Base Flood Elevation. The Project site shall be graded such that finished floor elevations are 3.5 feet above the Base Flood Elevation (BFE), and streets and pads are 3 feet above BFE to allow for future sea level rise, thereby elevating all housing and structures above the existing and potential future flood hazard area. If the FIRM for San Francisco is not finalized prior to implementation of the Project, the Project Applicant shall work with the City Surveyor to revise the City's Interim Floodplain Map. If the FIRM for San Francisco is finalized prior to implementation of the Project, the Project Applicant shall request that the Office of the City Administrator (Floodplain Manager) request a Letter of Map Revision based on Fill (LOMR-F) from FEMA that places the Project outside SFHA and requires that the FIRM is updated by FEMA to reflect revised regulatory floodplain designations. **MM HY-12a.2** Shoreline Improvements for Future Sea-Level Rise. Shoreline and public access improvements shall be designed to allow future increases in elevation along the shoreline edge to keep up with higher sea level rise values, should they occur. Design elements shall include providing adequate setbacks to allow for future elevation increases of at least 3 feet from the existing elevation along the shoreline. Before the first Small Lot Final Map is approved, the Project Applicant must petition the appropriate governing body to form (or annex into if appropriate) and administer a special assessment district or other funding mechanism to finance and construct future improvements necessary to ensure that the shoreline, public facilities, and public access improvements will be protected should sea level rise exceed 16 inches at the perimeter of the Project. Prior to the sale of the first residential unit within the Project, the legislative body shall have acted upon the petition to include the property within the district boundary. The newly formed district shall also administer a Monitoring and Adaptive Management Plan to monitor sea level and implement and maintain the protective improvements.	**LTS/M**
Impact HY-12b Implementation of the Project at HPS Phase II would not place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	**PS**	**MM HY-12a.1** and **MM HY-12a.2** would apply to this impact.	**LTS/M**
Impact HY-13 Implementation of the Project would not place structures within a 100-year flood hazard area or impede or redirect flood flows.	**PS**	**MM HY-12a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact HY-13a Implementation of the Project at Candlestick Point would not place structures within a 100-year flood hazard area that could impede or redirect flood flows.	**LTS**	No mitigation is required.	**LTS**
Impact HY-13b Implementation of the Project at HPS Phase II would not place structures within a 100-year flood hazard area or impede or redirect flood flows.	**PS**	**MM HY-13b** Floodplain Development Permit. To reduce the impacts of placing structures in a 100-year flood hazard area that could impede or redirect flows, the Project Applicant shall implement that following measures: ■ The Project Applicant shall obtain a Floodplain Development Permit from the Office of the City Administrator in accordance with the City's floodplain management ordinance that includes a hydraulic evaluation to determine whether structures or structural elements would impede or redirect flood flows and mandates minimum design and construction standards. Design and construction methods shall comply with NFIP requirements for placing structures in Zone V. ■ The Floodplain Development Permit shall include a "V-Zone Certification" in accordance with the NFIP. As part of the certification, a professional engineer or architect shall consider the NFIP "Free-of-Obstruction" requirement, to ensure that floodwaters or waves would not be deflected into a building or adjacent structure.	**LTS/M**
Impact HY-13c The Yosemite Slough bridge would not place structures within a 100-year flood hazard area or impede or redirect flood flows.	**LTS**	No mitigation is required.	**LTS**
Impact HY-14 Implementation of the Project would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.	**PS**	**MM HY-14** Shoreline Improvements to Reduce Flood Risk. To reduce the flood impacts of failure of existing shoreline structures, the Project Applicant shall implement shoreline improvements for flood control protection, as identified in the Candlestick Point/Hunters Point Development Project Proposed Shoreline Improvements report. Where feasible, elements of living shorelines shall be incorporated into the shoreline protection improvement measures. **MM HY-11a.2** would also apply to this impact.	**LTS/M**
Impact HY-15 Implementation of the Project would not expose people or structures to inundation by seiche, tsunami, or mudflow.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
SECTION III.N (BIOLOGICAL RESOURCES)			
(Note: As mentioned in the introductory text, Project impacts for Impact BI-3a through Impact BI-21b are provided by Impact BI-22 through Impact BI-26)			
Impact BI-1 Implementation of the Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	**NI**	No mitigation is required.	**NI**
Impact BI-2 Implementation of the Project would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats through substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	**LTS**	No mitigation is required. Implementation of **MM BI-7b** would be beneficial to grassland-associated raptors and terrestrial biological resources.	**LTS**
Impact BI-3a Construction at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on any plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**NI**	No mitigation is required.	**NI**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-3b Construction at HPS Phase II and construction of the Yosemite Slough bridge would not have a substantial adverse effect, either directly or through habitat modifications, on any plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**NI**	No mitigation is required.	**NI**
Impact BI-4a Construction at Candlestick Point would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* through direct removal, filling, hydrological interruption, or other means.	**PS**	**MM BI-4a.1** Wetlands and Jurisdictional/Regulated Waters Mitigation for Temporary and/or Permanent Impacts. Wetlands and jurisdictional waters shall be avoided to the maximum extent practicable for all Project components. For example, any measures taken to improve the existing shoreline of Candlestick Point or HPS Phase II for purposes of flood control, erosion control, or repair or stabilization of existing structures shall minimize the amount of fill to be placed in jurisdictional areas. Where avoidance of existing wetlands and drainages is not feasible, and before any construction activities are initiated in jurisdictional areas, the Applicant shall obtain the following permits, as applicable to the activities in question: ■ CWA Section 404 permit from the USACE. ■ Section 10 *Rivers and Harbors Act* Permit from the USACE. ■ CWA Section 401 water quality certification from the RWQCB, and/or Report of Waste Discharge for Waters of the State. ■ CWA Section 402/National Pollution Discharge Elimination System permit from SWRCB [requiring preparation of a Stormwater Pollution Prevention Plan (SWPPP)]. ■ CDFG Section 1602 streambed alteration agreement from CDFG. ■ A permit from the BCDC. ■ Dredging permits from the USACE and BCDC as required, obtained through the Dredged Material Management Office (DMMO) process. Copies of these permits shall be provided to the contractor, along with the construction specifications. The Project Applicant shall be responsible for complying with all of the conditions set forth in these permits, including any financial responsibilities. Compensation for impacts to wetlands and jurisdictional waters shall be required to mitigate any permanent impacts to these habitats to less-than significant-levels. Such mitigation shall also be developed (separately from the CEQA process) as a part of the permitting process with the USACE, or for non-USACE-jurisdictional wetlands,	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		during permitting through the SFRWQCB, BCDC, and/or CDFG. The exact mitigation ratio shall be established during the permitting process, and depends on a number of factors, including the type and value of the wetlands permanently affected by the Project; however, mitigation shall be provided at a ratio of no less than 1:1 (at least 1 acre of mitigation for every 1 acre of waters of the US/State permanently filled). Mitigation could be achieved through a combination of on-site restoration or creation of wetlands or aquatic habitats (including removal of on-site fill or structures such as piers, resulting in a gain of wetland or aquatic habitats); off-site restoration/creation; and/or mitigation credits purchased at mitigation banks within the San Francisco Bay Region. However, any mitigation for impacts to jurisdictional waters providing habitat for special-status fish such as the green sturgeon, Central California Coast steelhead, Chinook salmon, and longfin smelt must result in the restoration or creation (at a minimum 1:1 ratio) of suitable habitat for these species, and any mitigation for impacts to jurisdictional wetlands or other waters that are considered EFH by the NMFS must result in the restoration or creation (at a minimum 1:1 ratio) of EFH. Suitably planned mitigation sites may satisfy mitigation requirements for jurisdictional areas, special-status fish, and EFH simultaneously (i.e., in the same mitigation areas) if the mitigation satisfies all these needs. For funding of off-site improvements or purchase of mitigation bank credits, the Project Applicant shall provide written evidence to the City/Agency that either (a) compensation has been established through the purchase of a sufficient number of mitigation credits to satisfy the mitigation acreage requirements of the Project activity, or (b) funds sufficient for the restoration of the mitigation acreage requirements of the Project activity have been paid to the BCDC, CCC, or other entity or agency that offers mitigation credits in the San Francisco Bay Area. For areas to be restored, to mitigate for temporary or permanent impacts, the Project Applicant shall prepare and implement a Wetland and Jurisdictional Waters Mitigation Monitoring Plan (Mitigation Monitoring Plan). The Plan shall be submitted to the regulatory agencies along with permit application materials for approval, along with a copy to the City/Agency. The Project Applicant shall retain a restoration ecologist or wetland biologist to develop the Wetland and Jurisdictional Waters Mitigation and Monitoring Plan, and it shall contain the following components (or as otherwise modified by regulatory agency permitting conditions): 1. Summary of habitat impacts and proposed mitigation ratios, along with a description of any other mitigation strategies used to achieve the overall mitigation ratios, such as funding of off-site improvements and/or purchase of mitigation bank credits 2. Goal of the restoration to achieve no net loss of habitat functions and values 3. Location of mitigation site(s) and description of existing site conditions 4. Mitigation design: ■ Existing and proposed site hydrology ■ Grading plan if appropriate, including bank stabilization or other site stabilization features ■ Soil amendments and other site preparation elements as appropriate	

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

- Planting plan
- Irrigation and maintenance plan
- Remedial measures/adaptive management, etc.

5. Monitoring plan (including final and performance criteria, monitoring methods, data analysis, reporting requirements, monitoring schedule, etc.)
6. Contingency plan for mitigation elements that do not meet performance or final success criteria.

Restoration and/or creation of wetlands or aquatic habitats could occur on site or off site and at one or more locations, as approved by the regulatory agencies. Impacts occurring due to activities on Candlestick Point may be mitigated by restoration or creation activities on HPS Phase II and vice versa. For example, loss of open water habitat that might result from construction of shoreline treatments could potentially be mitigated by the removal of fill or structures from aquatic habitat on HPS Phase II.

The Project Applicant, or its agent, shall implement the Wetland and Jurisdictional Waters Mitigation Monitoring Plan. At least five years of monitoring (or more if required as a condition of the permits) shall be conducted to document whether the success criteria (that are determined as part of the mitigation plan) are achieved, and to identify any remedial actions that must be taken if the identified success criteria are not met. Annual monitoring reports (described below) shall be submitted to CDFG, the USACE, the BCDC, the City/Agency, and the SFRWQCB. Each report shall summarize data collected during the monitoring period, describe how the habitats are progressing in terms of the success criteria, and discuss any remedial actions performed. Additional reporting requirements imposed by permit conditions shall be incorporated into the Wetland and Jurisdictional Waters Mitigation Monitoring Plan and implemented.

Success criteria for specified years of monitoring for vegetated mitigation wetlands are as follows (though these may be subject to change pending development of specific Mitigation and Monitoring Plans and consultation during the permit process):

- Year 1 after restored areas reach elevations suitable for colonization by wetland plants: 10 percent combined area and basal cover (rhizomatous turf) of all vegetation in the preserve wetland; at least two hydrophytic plants co-dominant with whatever other vegetative cover exists.
- Year 3 after restored areas reach colonization elevation: 50 percent combined area and basal cover (rhizomatous turf) of all vegetation; prevalence of hydrophytic species in terms of both cover and dominant species composition of the vegetation; native vascular species shall comprise 95 percent of the vegetation in the preserve wetland.
- Year 5 after restored areas reach colonization elevation: 70 percent combined area and basal cover (rhizomatous turf) of all vegetation; more than 50 percent dominance in terms of both cover and species composition of facultative (FAC), facultative wetland (FACW), and obligate (OBL) species; native vascular species shall comprise 95 percent of the vegetation in the preserve wetlands.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		Other success criteria shall be developed for open water/mud flat habitats (which would not be expected to support vegetation) or for wetland complexes specifically designed to contain extensive areas of channels, pannes, or flats that would not be vegetated. In addition, the final Project design shall avoid substantial adverse effects to the pre-Project hydrology, water quality, or water quantity in any wetland that is to be retained on site. This shall be accomplished by avoiding or repairing any disturbance to the hydrologic conditions supporting these wetlands, as verified through an on-site Wetland Protection Plan that shall be prepared by a restoration ecologist or wetland biologist that is retained by the Project Applicant, and submitted to regulatory agencies for approval, along with a copy to the City/Agency. If such indirect effects cannot be avoided, compensatory mitigation shall be provided for the indirectly affected wetlands at a minimum 1:1 ratio, as described above. Mitigation for indirectly impacted wetlands shall be described in the Wetland and Jurisdictional Waters Mitigation and Monitoring Plan. Project features resulting in impacts to open water areas as a result of the marina, bridge, and breakwater construction shall be designed to be the minimum size required to meet their designated need. The opening in the breakwater shall be large enough and positioned such that it would allow for a complete daily exchange of water within the marina that would otherwise result from normal tidal flow, as determined by a coastal engineer and an aquatic biologist. This opening shall be designed to minimize disruption to the local hydrology generated by the breakwater and allow for normal tidal flow to ensure the daily exchange of nutrients. **MM BI-4a.2** Wetlands and Jurisdictional/Regulated Waters Impact Minimization for Construction-Related Impacts. The Project Applicant shall ensure that the contractor minimizes indirect construction-related impacts on wetlands and jurisdictional/regulated waters throughout the Study Area by implementing the following Best Management Practices (BMPs): ■ Prior to any construction activities on the site, a protective fence shall be installed a minimum of one foot (or greater, if feasible) from the edge of all wetland habitat to be avoided in the immediate vicinity of the proposed construction areas. Prior to initiation of construction activities, a qualified biologist shall inspect the protective fencing to ensure that all wetland features have been appropriately protected. No encroachment into fenced areas shall be permitted during construction and the fence shall remain in place until all construction activities within 50 feet of the protected feature have been completed. ■ Construction inspectors shall routinely inspect protected areas to ensure that protective measures remain in place and effective until all construction activities near the protected resource have been completed. The fencing shall be removed immediately following construction activities. ■ To maintain hydrologic connections, the Project design shall include culverts for all seasonal and perennial drainages that are waters of the United States and/or Waters of the State. ■ Sediment mitigation measures shall be in place prior to the onset of Project construction and shall be monitored and maintained until construction activities have been completed. Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be disposed of at a regional landfill or at another approved and/or properly permitted location. Stockpiles that are to remain on the site throughout the wet season shall be protected to prevent erosion.	

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Where determined necessary by regulatory agencies, geotextile cushions and other appropriate materials (i.e., timber pads, prefabricated equipment pads, geotextile fabric) shall be used in saturated conditions to minimize damage to the substrate and vegetation. ■ Exposed slopes and banks shall be stabilized immediately following completion of construction activities to reduce the effects of erosion on the drainage system. ■ In highly erodible areas, such as Yosemite Slough, banks shall be stabilized using a non-vegetative material that shall bind the soil initially and break down within a few years. If, during review of the grading permit for this area, the City/Agency determines that more aggressive erosion control treatments are needed, the contractor shall be directed to use geotextile mats, excelsior blankets, or other soil stabilization products. ■ The contractors shall develop a Storm Water Pollution Prevention Plan (SWPPP) prior to construction. As discussed in the Regulatory Framework of the Hydrology and Water Quality section of this EIR, the SWPPP will comply with applicable local, state, and federal requirements. Erosion control BMPs may include, but are not limited to, the application of straw mulch; seeding with fast growing grasses; construction of berms, silt fences, hay bale dikes, stormwater detention basins, and other energy dissipaters. BMPs shall be selected and implemented to ensure that contaminants are prevented from entering the San Francisco Bay during construction and operation of the facilities shall protect water quality and the marine species in accordance with all regulatory standards and requirements. ■ Testing and disposal of any dredged sediment shall be conducted as required by the USACE and the Long-Term Management Strategy (LTMS)[2] ■ All temporarily impacted wetlands and other jurisdictional waters, whether in tidal or non-tidal areas, shall be restored to pre-construction contours following construction. Such impact areas include areas that are dewatered (e.g., using coffer dams) and/or used for construction access. Temporarily impacted wetlands that were vegetated prior to construction shall be revegetated in accordance with a Wetlands and Jurisdictional Water Mitigation and Monitoring Plan as described above. ■ For impacts to tidal habitats: > Conduct all work in dewatered work areas > Install sediment curtains around the worksite to minimize sediment transport > Work only during periods of slack, tide (minimal current) and low wind to minimize transport of sediment laden water	

[2] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Implementation Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-4b Construction at HPS Phase II would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	**PS**	**MM BI-4a.1** and **MM BI-4a.2** would apply to this impact.	**LTS/M**
Impact BI-4c Construction of the Yosemite Slough bridge would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	**PS**	**MM BI-4c** Mitigation for Shading Impacts to Jurisdictional/Regulated Waters. Mud flats and aquatic habitats impacted by permanent shading from the Yosemite Slough bridge shall be mitigated by the creation or restoration, either on site, off site, and/or via purchase of mitigation bank credits, at a 0.5:1 (mitigation:impacted) ratio. Aside from the mitigation ratio, such mitigation shall be provided as described for mitigation measure MM BI-4a.1. **MM BI-4a.1** and **MM BI-4a.2** would also apply to this impact.	**LTS/M**
Impact BI-5a Construction at Candlestick Point would not have a substantial adverse effect on eelgrass beds, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS.	**NI**	No mitigation is required.	**NI**
Impact BI-5b Construction at HPS Phase II and construction of the Yosemite Slough bridge would not have a substantial adverse effect on eelgrass beds, a sensitive natural community identified in local or regional	**PS**	**MM BI-5b.1** Avoidance of Impacts to Eelgrass. As the design of shoreline treatments progresses, and a specific Shoreline Treatment Plan is determined, the Plan shall minimize any in-water construction required for installation of any treatment measures near either of the two eelgrass locations noted above. **MM BI-5b.2** Eelgrass Survey. Prior to the initiation of construction of the Yosemite Slough bridge or construction of shoreline treatments, an update to the existing eelgrass mapping shall be conducted to determine the precise locations of the eelgrass beds. This survey shall occur when a final Shoreline Treatment Plan has been prepared. The survey shall be conducted by a biologist(s) familiar with eelgrass identification and ecology and approved by NMFS to conduct such a survey. The area to be surveyed shall encompass the mapped eelgrass beds, plus a	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
plans, policies, and regulations or by the CDFG or USFWS.		buffer of 750 feet. Survey methods shall employ either SCUBA or sufficient grab samples to ensure that the bottom was adequately inventoried. The survey shall occur between August and October and collect data on eelgrass distribution, density, and depth of occurrence for the survey areas. The edges of the eelgrass beds shall be mapped. At the conclusion of the survey a report shall be prepared documenting the survey methods, results, and eelgrass distribution within the survey area. This report shall be submitted to NMFS for approval. The survey data shall feed back into the shoreline treatment design process so that Project engineers can redesign the treatments to avoid or minimize any direct impacts to eelgrass beds. If the shoreline treatments can be adjusted so that no direct impacts to eelgrass beds would occur, no further mitigation under this measure would be required for shoreline treatment construction. Management of water quality concerns is addressed through mitigation measure MM BI-5b.4 and shall be required to minimize sediment accumulation on the eelgrass. If direct impacts to eelgrass beds cannot be avoided, either by Hunters Point shoreline treatments or Yosemite Slough bridge construction, mitigation measure MM BI-5b.3 shall be implemented. **MM BI-5b.3** Compensatory Eelgrass Mitigation. If direct impacts to eelgrass beds cannot be avoided, compensatory mitigation shall be provided in conformance with the Southern California Eelgrass Mitigation Policy. Mitigation shall entail the replacement of impacted eelgrass at a 3:1 (mitigation:impact) ratio on an acreage basis, based on the eelgrass mapping described in mitigation measure MM BI-5b.2 and detailed designs of the feature(s) that would impact eelgrass beds. Such mitigation could occur either off site or on site.[3] Off-site mitigation could be achieved through distribution of a sufficient amount of funding to allow restoration or enhancement of eelgrass beds at another location in the Bay. If this option is selected, all funds shall be distributed to the appropriate state or federal agency or restoration-focused non-governmental agency (i.e., CDFG restoration fund, California Coastal Conservancy, Save the Bay, etc). The Project Applicant shall provide written evidence to the City/Agency that either a) compensation has been established through the purchase of a sufficient number of mitigation credits to satisfy the mitigation acreage requirements of the Project activity, or b) funds sufficient for the restoration of the mitigation acreage requirements of the Project activity have been paid. These funds shall be applied only to eelgrass restoration within the Bay. If on-site mitigation is selected as the appropriate option, the Project Applicant shall retain a qualified biologist familiar with eelgrass ecology (as approved by the City/Agency) to prepare and implement a detailed Eelgrass Mitigation Plan. Unless otherwise directed by NMFS, the Eelgrass Mitigation Plan shall follow the basic outline and contain all the components required of the Southern California Eelgrass Mitigation Policy (as revised in 2005),[4] including: identification of the mitigation need, site, transplant methodology, mitigation extent (typically 3:1	

[3] NMFS, Southwest Regional Office, Southern California Eelgrass Mitigation Policy, as revised August 30, 2005. Website: http://swr.nmfs.noaa.gov/hcd/policies/EELPOLrev11_final.pdf. Accessed July 20, 2009.
[4] NMFS, Southwest Regional Office, Southern California Eelgrass Mitigation Policy, as revised August 30, 2005. Website: http://swr.nmfs.noaa.gov/hcd/policies/EELPOLrev11_final.pdf. Accessed July 20, 2009.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		on an acreage basis[5]), monitoring protocols (including frequency, staffing, reviewing agencies, duration, etc), and success criteria. A draft Eelgrass Mitigation Plan shall be submitted to NMFS, for its review and approval prior to implementation, with a copy to the City/Agency. Once the plan has been approved, it shall be implemented in the following appropriate season for transplantation. Restored eelgrass beds shall be monitored for success over a 5-year period. **MM BI-5b.4** Eelgrass Water Quality BMPs. To prevent sediment that could be suspended during construction from settling out onto eelgrass, for any shoreline treatments within 750 feet of identified eelgrass beds, the Project Applicant shall require the selected contractor to implement appropriate BMPs that could include any or all of the following options, or others deemed appropriate by NMFS: 1. Conduct all work in dewatered work areas 2. Conduct all in-water work during periods of eelgrass dormancy (November 1-March 31) 3. Install sediment curtains around the worksite to minimize sediment transport 4. Work only during periods of slack tide (minimal current) and low wind to minimize transport of sediment laden water	
Impact BI-6a Construction at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on any bird species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**PS**	**MM BI-6a.1** Impact Avoidance and Pre-Construction Surveys for Nesting Special-Status and Legally Protected Avian Species. The following measures shall be implemented by the Project Developer to avoid impacts to nesting birds. 1. Not more than 15 days prior to construction activities that occur between February 1 and August 31, surveys for nesting birds shall be conducted by a qualified biologist (one familiar with the breeding biology and nesting habits of birds that may breed in the Project vicinity) that is selected by the Project Developer, and approved by the City/Agency. Surveys shall cover the entire area to be affected by construction and the area within a 250-foot buffer of construction or ground-disturbing activities. The results of the surveys, including survey dates, times, methods, species observed, and a map of any discovered nests, shall be submitted to the City/Agency. If no active avian nests (i.e. nests with eggs or young) are identified on or within 250 feet of the limits of the disturbance area, no further mitigation is necessary. Phased construction work shall require additional surveys if vegetation or building removal has not occurred within 15 days of the initial survey or is planned for an area that was not previously surveyed. Alternatively, to avoid impacts, the Project Developer shall begin construction after the previous breeding season for local raptors and other special-status species has ended (after August 31) and before the next breeding season begins (before February 1). 2. If active nests (with eggs or young) of special-status or protected avian species are found within 250 feet of the proposed disturbance area, a minimum 250-foot no-disturbance buffer zone surrounding active raptor	**LTS/M**

[5] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Implementation Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001; Appendix F – ESA and EFH Consultation.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

nests and a minimum 100-foot buffer zone surrounding nests of other special-status or protected avian species shall be established until the young have fledged. Project activities shall not occur within the buffer as long as the nest is active. The size of the buffer area may be reduced if a qualified biologist familiar with the species' nesting biology (as approved by the City/Agency) and CDFG determine it would not be likely to have adverse effects on the particular species. Alternatively, certain activities may occur within the aforementioned buffers, with CDFG concurrence, if a qualified biologist monitors the activity of nesting birds for signs of agitation while those activities are being performed. If the birds show signs of agitation suggesting that they could abandon the nest, activities would cease within the buffer area. No action other than avoidance shall be taken without CDFG consultation.

3. Completion of the nesting cycle (to determine when construction near the nest can commence) shall be determined by a qualified biologist experienced in identification and biology of the specific special-status or protected species.

MM BI-6a.2 Burrowing Owl Protocol Surveys and Mitigation. Because burrowing owls may take refuge in burrows any time of year, species-specific measures are necessary to avoid take of this species. The following measures shall be undertaken by the Project Developer to protect burrowing owls.

Prior to construction activities, focused pre-construction surveys shall be conducted for burrowing owls where suitable habitat is present within the construction areas. Surveys shall be conducted by a qualified biologist (i.e., one who is familiar with burrowing owl ecology and experienced in performing surveys for them, approved by the City/Agency) no more than 30 days prior to commencement of construction activities. These surveys shall be conducted in accordance with the CDFG burrowing owl survey protocol contained within California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines, or any more current equivalent should new guidelines be released before construction.

1. If no occupied burrows are found in the survey area, a letter report documenting survey methods and findings shall be submitted to the City/Agency and CDFG, and no further mitigation is necessary.
2. If unoccupied burrows are found during the non-breeding season, prior to construction activities, the Project Developer shall collapse the unoccupied burrows, or otherwise obstruct their entrances to prevent owls from entering and nesting in the burrows. This measure would prevent inadvertent impacts during construction activities.
3. If occupied burrows are found, a letter report documenting survey methods and findings (including a map showing the locations of the occupied burrows) shall be submitted to the City/Agency and CDFG. Impacts to the burrows shall be avoided by providing a construction-free buffer of 250 feet during the nesting season (February 1 through August 31). A buffer of 165 feet from the active burrows should be provided during the non-breeding season (September 1 through January 31) if feasible, though a reduced buffer is acceptable during the non-breeding season as long as construction avoids direct impacts to the burrow(s) used by the owls. The size of the buffer area may be reduced if the CDFG determines it would not be likely to have adverse effects on the owls. No Project activity shall commence within the buffer area until a qualified

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		biologist (as approved by the City/Agency) confirms that the burrow is no longer occupied. If the burrow is occupied by a nesting pair, as recommended by the California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines, a minimum of 6.5 acres of foraging habitat contiguous (immediately adjacent) to the burrow shall be maintained until the nesting season is over. If the foraging habitat contiguous to the occupied burrow is currently less than 6.5 acres, the entire foraging habitat shall be maintained until the nesting season is over. 4. If impacts to occupied burrows are unavoidable, passive relocation techniques approved by CDFG shall be used to evict owls from burrows within the construction area prior to construction activities. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist (as approved by the City/Agency) verifies through non-invasive methods that juveniles from the occupied burrows are foraging independently and are capable of independent survival, or verifies the owls have not yet laid eggs. If any breeding owls must be relocated (i.e., after the nesting season has ended), mitigation of impacts to lost foraging and nesting habitat for relocated pairs shall follow guidelines provided in the California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines, which depending upon conditions detailed in the guidance (such as mitigation habitat quality), range from 7.5 to 19.5 acres per pair. This mitigation may take the form of the purchase of credits in a burrowing owl mitigation bank or the preservation and management of the required habitat acreage on site (e.g., in the Grasslands Ecology Park) or off site. If mitigation is provided via on-site or off-site habitat preservation and management, a Burrowing Owl Habitat Management Plan shall be prepared by a qualified biologist and submitted to the CDFG for review and approval, along with a copy to the City/Agency. This plan shall detail the location of the mitigation site, the means of preservation of the site (i.e., via a conservation easement), any enhancement and management measures necessary to ensure that habitat for burrowing owls is maintained in the long term, a monitoring program, and the size of an endowment established for the long-term maintenance of the site.	
Impact BI-6b Construction at HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on any bird species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**PS**	**MM BI-6b** American Peregrine Falcon Nest Protection Measures. To protect the nest of peregrine falcons during construction, the following measures shall be implemented by the Project Developer prior to construction or other disturbance within 500 feet of the Re-gunning crane nest. 1. Not more than 30 days prior to construction activities that occur between February 1 and August 15, surveys for nesting peregrine falcons shall be conducted on the Re-gunning crane, and within a 500-foot buffer surrounding the potential nesting location. Surveys shall be performed by a qualified biologist (i.e., one familiar with falcon biology and nesting) that is selected by the Project Developer, and approved by the City/Agency. The results of the surveys shall be submitted to the City/Agency and the CDFG. If no active peregrine falcon nests, eggs, or breeding activity, are identified on or within 500 feet of the limits of the disturbance area, no further mitigation is necessary. Alternatively, to avoid impacts, the Project Developer can begin construction after the previous breeding season has ended (after August 31) and before the next breeding season begins (before February 1). 2. If active peregrine nests or breeding activity are observed within the survey area, a minimum 250-foot no disturbance buffer zone surrounding the nesting location shall be established until the young have fledged.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		Within this buffer, no Project construction activities shall occur while the nest is active. The size of the buffer area may be reduced if a qualified biologist and CDFG determine it would not be likely to have adverse effects on the falcons. No action other than avoidance shall be taken without CDFG consultation. 3. No new Project construction activity shall commence within the buffer area until young have fledged and the nest is no longer active, or until nesting has been terminated for reasons unrelated to Project activities. Completion of the nesting cycle shall be determined by a qualified biologist who is experienced in peregrine falcon breeding biology (as determined and approved by the City/Agency). **MM BI-6a.1** and **MM BI-6a.2** would also apply to this impact.	
Impact BI-7a Construction at Candlestick Point would not have a substantial adverse effect on the quantity and quality of suitable foraging habitat for raptors.	**LTS**	No mitigation is required. Implementation of **MM BI-7b** would be beneficial to grassland-associated raptors.	**LTS**
Impact BI-7b Implementation of the Project at HPS Phase II would not have a substantial adverse effect on the quantity and quality of suitable foraging habitat for raptors.	**PS**	**MM BI-7b** Enhancement of Raptor Foraging Habitat. The Draft Parks, Open Space, and Habitat Concept Plan shall implement, at a minimum, the following measures in open space areas outside the CPSRA, and if allowed, within the CPSRA area: ■ **Restoration and Management of Grasslands:** To maintain grassland-associated wildlife species on the site, grasslands extensive enough to support such species shall be maintained and enhanced through the restoration of native grasses. Such grassland habitat shall not be well manicured or regularly mown. No trees shall be planted within such areas, and shrub cover would be limited to a few small, scattered patches of low-statured coastal scrub plants. At a minimum, replacement of non-native grassland impacted at HPS Phase II with native-dominated grassland shall occur at a ratio of 1:1 (1 acre of native-dominated grassland restored: 1 acre of non-native grassland impacted). ■ **Increase in Tree/Shrub Cover:** Trees and shrubs (particularly natives) shall be planted and maintained outside the designated grassland restoration area to provide foraging habitat for raptors and other migratory birds, and cover for mammals, reptiles, and smaller birds that may serve as raptor prey. While native vegetation shall be favored, site-appropriate non-native trees and shrubs that provide food or structural resources that are particularly valuable to native wildlife shall also be considered. Approximately 10,000 net new trees shall be planted at the Project site and in the community, in addition to trees that will be replaced as required by the Urban Forestry Ordinance or MM BI-14a. The elements identified above shall be reviewed and approved by a qualified biologist (one familiar with the ecology of the Project site), and the Draft Parks, Open Space, and Habitat Concept Plan shall be implemented during construction of the Project. This plan shall be approved by the City/Agency prior to construction, and its preparation and implementation shall be the financial responsibility of the Project Applicant.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-8a Construction at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on the western red bat, a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**LTS**	No mitigation is required. **MM BI-7b** and **MM BI-14a** would result in a beneficial effect on habitat for the western red bat.	**LTS**
Impact BI-8b Construction at HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on the western red bat, a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**LTS**	No mitigation is required. Implementation of **MM BI-7b** and **MM BI-14a** would be beneficial to the habitat for the western red bat.	**LTS**
Impact BI-9a Pile driving associated with construction at Candlestick Point would not have a substantial adverse effect either directly or through habitat modifications, on marine mammals or fish identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**NI**	No mitigation is required.	**NI**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-9b Pile driving associated with construction of the marina and the Yosemite Slough bridge would not have a substantial adverse effect at HPS Phase II, either directly or through habitat modifications, on marine mammals or fish identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**PS**	**MM BI-9b** Pile Driving Design and Minimization Measures. To minimize impacts on fish and marine mammals, the Project Applicant shall be implemented the following measure to reduce the amount of pressure waves generated by pile driving. The first set of measures shall be implemented during Project design. The second set of measures shall be implemented during construction. Design Measures: 1. Engineer structures to use fewer or smaller piles, where feasible, and preferably, solid piles. 2. Design structures that can be installed in a short period of time (i.e., during periods of slack tide when fish movements are lower). 3. Do not use unsheathed creosote-soaked wood pilings. The City/Agency, with consultation from a qualified biologist who is familiar with marine biology, as approved by the City/Agency, shall review the final Project design to ensure that these design requirements have been incorporated into the Project. Construction Measures: 1. Drive piles with a vibratory device instead of an impact hammer if feasible. 2. Restrict pile driving of steel piles to the June 1 to November 30 work window, or as otherwise recommended by NMFS (driving of concrete piles would not be subject to this condition). 3. Avoid installation of any piles during the Pacific herring spawning season of December through February. Consult with the CDFG regarding actual spawning times if pile installation occurs between October and April. 4. If steel piles must be driven with an impact hammer, an air curtain shall be installed to disrupt sound wave propagation, or the area around the piles being driven shall be dewatered using a cofferdam. The goal of either measure is to disrupt the sound wave as it moves from water into air. 5. If an air curtain is used, a qualified biologist shall monitor pile driving to ensure that the air curtain is functioning properly and Project-generated sound waves do not exceed the threshold of 180-decibels generating 1 micropascal (as established by NMFS guidelines). This shall require monitoring of in-water sound waves during pile driving. 6. Unless the area around the piles is dewatered during pile driving, a qualified biologist shall be present during pile driving of steel piles to monitor the work area for marine mammals. Driving of steel piles shall cease if a marine mammal approaches within 250 feet of the work area or until the animal leaves the work area of its own accord.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-10a Construction of the Candlestick Point would require the removal of hard substrates (riprap) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species.	**LTS**	No mitigation is required.	**LTS**
Impact BI-10b Construction at HPS Phase II would require removal of hard substrates (docks, riprap, seawalls, pilings, etc) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species.	**LTS**	No mitigation is required.	**LTS**
Impact BI-10c Construction of the Yosemite Slough bridge may require removal of hard substrates (docks, riprap, seawalls, pilings, etc) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species.	**LTS**	No mitigation is required.	**LTS**
Impact BI-11a Construction at Candlestick Point would not have a substantial adverse effect on designated critical habitat for green sturgeon and Central California Coast steelhead, and would not result in impacts to individuals of these species as well as Chinook salmon and longfin smelt through disturbance and loss of aquatic and mudflat	**PS**	**MM BI 4a.1** and **MM BI 4a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
habitat as a result of construction of shoreline revetments.			
Impact BI-11b Construction at HPS Phase II would not have a substantial adverse effect on designated critical habitat for green sturgeon and Central California Coast steelhead, and would not result in impacts to individuals of these species as well as Chinook salmon and longfin smelt through temporary and permanent disturbance of aquatic and mudflat habitat during construction of shoreline revetments.	**PS**	**MM BI 4a.1** and **MM BI 4a.2** would apply to this impact.	**LTS/M**
Impact BI-11c Construction of the Yosemite Slough bridge would not have a substantial adverse effect on designated critical habitat for green sturgeon and Central California Coast steelhead and would not result in impacts to individuals of these species, Chinook salmon, or longfin smelt through disturbance or loss of aquatic and mudflat habitat as a result of construction of shoreline revetments.	**PS**	**MM BI 4a.1** and **MM BI 4a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-12a Construction at Candlestick Point would not have a substantial adverse effect on designated essential fish habitat through (EFH) or result in a substantial change in total available essential fish habitat through placement of riprap and other fill or through temporary water-quality impacts during construction. EFH is a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS.	**PS**	**MM BI-12a.1** Seasonal Restrictions on In-Water Work. In-water work when juvenile salmonids are moving through the estuary on the way to the ocean or when groundfish and prey species could be directly impacted shall be avoided. Because steelhead are potentially present, the allowed dredge window for this area of the San Francisco Bay is June 1 through November 30. All in-water construction shall occur during this window. If completion of in-water work within this period is not feasible due to scheduling issues, new timing guidelines that shall be established and submitted to NMFS and CDFG for review and approval. **MM BI-12a.2** Worker Training. Personnel involved in in-water construction and deconstruction activities shall be trained by a qualified biologist (experienced in construction monitoring, as approved by the City/Agency) in the importance of the marine environment to special-status fish, birds, and marine mammals and the environmental protection measures put in place to prevent impacts to these species, their habitats, and Essential Fish Habitat. The training shall include, at a minimum, the following: ■ A review of the special-status fish, birds, and marine mammals and sensitive habitats that could be found in work areas ■ Measures to avoid and minimize adverse effects to special-status fish, birds, marine mammals, their habitats, and Essential Fish Habitat ■ A review of all conditions and requirements of environmental permits, reports, and plans (i.e., USACE permits) **MM BI-4a.1** and **MM BI-4a.2** would also apply to this impact.	**LTS/M**
Impact BI-12b Construction at HPS Phase II would not have a substantial adverse effect on designated essential fish habitat through (EFH) through placement of riprap and other fill, or through temporary water-quality impacts during construction. EFH is a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS.	**PS**	**MM BI-12b.1** Essential Fish Habitat Avoidance and Minimization Measures. The following mitigation measures have been adapted from Amendment 11 of the West Coast Groundfish Plan[6] and Appendix A of the Pacific Coast Salmon Plan.[7] Incorporation of the following, or equivalent mitigation as otherwise required by the USACE or NMFS, would reduce the impacts to Essential Fish Habitat (EFH) to a level considered less than significant. Unless modified by the federal permitting agencies (NMFS or USACE), these measures shall be implemented during construction by the Project Applicant. Any reporting required shall be specified in the USACE permits and reports shall be submitted to the USACE and NMFS. ■ If dredging is required, permits will be obtained through the Dredged Material Management Office (DMMO) process, and the following mitigation from the Long-Term Management Strategy (LTMS) shall be implemented: > Dredging shall avoid areas with submerged aquatic vegetation (eelgrass beds or other EFH areas of particular concern) especially where the action could affect groundfish, prey of outmigrating juvenile salmon or groundfish, larval marine species, or habitat for native oysters	**LTS/M**

[6] PFMC 1998. Essential Fish Habitat – West Coast Groundfish, Amendment 11.
[7] PFMC 1999. Appendix A: Identification and description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. *In* Pacific Coast Salmon Plan (1997) as amended through Amendment 14. Website: http://www.pcouncil.org/salmon/salfmp/a14.html.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*

> Sediments shall be tested for contaminants as per EPA and USACE requirements. Contaminated sediments shall be disposed of in accordance with EPA and USACE guidelines

> Slopes of the dredged area shall be gradual enough so that sloughing is unlikely to occur. Verification of these conditions shall be achieved through follow-up bathymetric surveys

> To minimize turbidity and potential resuspension of contaminated sediments, dredging shall use suction equipment, or similar equipment, when feasible. Where an equipment type may generate significant turbidity (i.e., clamshell), dredging shall be conducted using adequate engineering and best management practices to control turbidity. These include, but are not limited to, sediment curtains and tidal work windows.

- All construction equipment used in conjunction with in-water work (pipelines, barges, cranes, etc.) shall avoid wetlands, marshes, and areas of subaquatic vegetation (including eelgrass beds)
- Upland disposal options shall be considered for all spoils generated by on-site construction, especially if high levels of contaminants are present
- Maximize the use of clean dredged material for beneficial use opportunities, such as salt marsh restoration
- Use Best Management Practices (BMPs) for controlling pollution from marina operations, boatyards, and fueling facilities that meet, as applicable, the BMPs listed in the National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating[8]

MM BI-12b.2 Deconstruction/Construction Debris Recovery. A Seafloor Debris Minimization and Removal Plan shall be prepared by the Project Applicant and approved by the City/Agency, prior to initiation of in-water deconstruction (dismantling) or construction activities. The Plan shall be implemented during in-water deconstruction or construction activities, and such activities shall be monitored by a qualified biologist who is experienced in construction monitoring (as approved by the City/Agency). The Seafloor Debris Minimization and Removal Plan shall include, at a minimum:

- Debris field boundaries associated with deconstruction activities
- Identification of measures taken to minimize the potential for debris to fall into aquatic habitats (i.e., the use of netting below in-water construction or deconstruction areas)
- Deconstruction equipment, tools, pipes, pilings, and other materials or debris that are inadvertently dropped into the Bay, along with their descriptions and locations
- Circumstances requiring immediate cessation of deconstruction activities and immediate initiation of search and recovery efforts, including procedures for implementing those recovery efforts
- How lost debris that is to be removed post-deconstruction is to be identified, who will be conducting search and recovery operations, and the survey methods to be employed to locate lost equipment and materials
- Criteria that will be used to:

[8] National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating. EPA 841-B-01-005, November 2001.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		> Determine whether recovery efforts are appropriate for the object being recovered and do not result in potential environmental impairment greater than if the debris was allowed to remain in place > When sufficient effort has been expended to recover a lost object(s) with no success and continued efforts to recover the seafloor debris have diminishing potential for success and/or result in environmental impairment greater than leaving the debris in place ■ Person(s) responsible for implementing the Plan and making the determination on the type of recovery required ■ How debris is to be disposed of or recycled ■ Metrics for determining when recovery efforts will be considered complete Following completion of all post deconstruction recovery efforts for seafloor debris, a report shall be prepared by the Project Applicant and submitted to the City/Agency detailing, at a minimum, (1) recovery activities during deconstruction and post-deconstruction, (2) listings of all lost and recovered debris, (3) final disposition of recovered debris, and (4) discussion of what debris could not be recovered and why. **MMBI-4a.1, MM BI-4a.2, MM BI-5b.1, MM BI-5b.2, MM BI-5b.3, MM BI-5b.4, MM BI-12a.1**, and **MM BI-12a.2** would also apply to this impact.	
Impact BI-12c Construction of the Yosemite Slough bridge would not have a substantial adverse effect on designated essential fish habitat through (EFH) through placement of riprap and other fill, or through temporary water-quality impacts during construction. EFH is a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS.	**PS**	**MM BI-4a.1, MM BI-4a.2, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1**, and **MM BI-12b.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-13a Construction at Candlestick Point would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.	**LTS**	No mitigation is required.	**LTS**
Impact BI-13b Construction at HPS Phase II and construction of the Yosemite Slough bridge would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, but it could impede the use of native wildlife nursery sites.	**PS**	**MM BI-5b.1** through **MM BI-5b.4** would apply to this impact.	**LTS/M**
Impact BI-14a Construction at Candlestick Point would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	**PS**	**MM BI-14a** Preservation and Replacement of Significant Trees, and Preservation and Planting of Street Trees. Construction activities outside of the Department of Public Works (DPW) jurisdiction could result in the disturbance or removal of a large number of trees. To minimize this impact, the following measures shall be implemented by the Project Applicant in these areas: 1. Avoidance of the removal of trees that meet the size specifications of significant trees in the Public Works Code Article 16 shall occur to the maximum extent feasible, and any such trees that are removed shall be replaced at a minimum of 1:1 (1 impacted:1 replaced). The species used for replacement shall be consistent with DPW recommendations. 2. Street trees shall be planted in all new development areas. The species, size, and locations shall be consistent with the requirements specified in Planning Code Section 143, including, but not limited to, the following: a) The street trees installed shall be a minimum of one 24-inch box tree for each 20 feet of frontage of the property along each street or alley, with any remaining fraction of 10 feet or more of frontage requiring an additional tree. Such trees shall be located either within a setback area on the lot or within the public right-of-way along such lot. b) The species of trees selected shall be suitable for the site, and, in the case of trees installed in the public right-of-way, the species and locations shall be subject to the approval by the DPW. Procedures	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		and other requirements for the installation, maintenance, and protection of trees in the public right-of-way shall be as set forth in Public Works Code Article 16. 3. If a significant tree or street tree will not be removed, but construction activities will occur within the dripline of such trees, a Tree Protection Plan shall be prepared by an International Society of Arboriculture (ISA) certified arborist, in accordance with the Urban Forestry Ordinance. This plan shall be submitted to the Planning Department for review and approval prior to issuance of a demolition or building permit. The Tree Protection Plan shall include measures to protect all parts of a tree from disturbance during construction, and may include the following: a) A site plan with tree species, trunk location, trunk diameter at breast height, and the canopy dripline area within development b) The use of protective fencing to establish an area to be left undisturbed during construction c) Protection specifications, including construction specifications such as boring instead of trenching for utility lines, or tree specifications such as drainage, fertilization, or irrigation measures d) Pruning specifications, if needed, to preserve the health of the tree and allow construction to proceed Implementation of **MM BI-7b** would be beneficial to protected trees.	
Impact BI-14b Construction at HPS Phase II and Yosemite Slough bridge would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	**PS**	**MM BI-14a** would apply to this impact. Implementation of **MM BI-7b** would be beneficial to protected trees.	**LTS/M**
Impact BI-15a Construction within the shoreline or Bay at Candlestick Point would not result in the disturbance of contaminated soil or the re-suspension of contaminated sediments.	**NI**	No mitigation is required.	**NI**
Impact BI-15b Construction within the shoreline or Bay at HPS Phase II would not result in the disturbance of contaminated soil or the re-suspension of contaminated sediments.	**PS**	**MM HZ-10b**, **MM HY-1a.1**, and **MM HY-1a.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-16a Implementation of the Project at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS or interfere substantially with the movement of any native resident or migratory fish, or impede the use of native wildlife nursery sites.	**LTS**	No mitigation is required. Implementation of **MM BI-7b** would be beneficial to terrestrial biological resources.	**LTS**
Impact BI-16b Implementation of the Project at HPS Phase II, including operation of the proposed marina, would not have a substantial adverse effect, either directly or through habitat modifications, on aquatic species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS or interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	**LTS**	No mitigation is required. Implementation of **MM BI-7b** would be beneficial to terrestrial biological resources.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-17a Implementation of the Project at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on nesting American peregrine falcons, identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**NI**	No mitigation is required.	**NI**
Impact BI-17b Implementation of the Project at HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on nesting American peregrine falcons, identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	**NI**	No mitigation is required.	**NI**
Impact BI-18a Implementation of the Project at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on aquatic species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the CDFG or USFWS, or have a substantial adverse effect on designated EFH, a sensitive natural community identified in local or regional plans, policies, and regulations or by the NMFS.	**NI**	No mitigation is required.	**NI**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-18b Implementation of the marina in HPS Phase II would require routine maintenance dredging of the marina, which could remove habitat or generate substantial increases in turbidity within the marina, but would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the CDFG or USFWS, or have a substantial adverse effect on designated EFH, a sensitive natural community identified in local or regional plans, policies, and regulations or by the NMFS.	**PS**	**MM BI-18b.1** Maintenance Dredging and Turbidity Minimization Measures for the Operation of the Marina. Maintenance dredging for the marina could remove or generate sediment plumes that could impact special-status species, their habitats, and Essential Fish Habitat (EFH). To minimize this effect, the following measures shall be implemented by the Project Applicant: 1. Conduct a detailed survey for native oysters in all suitable substrates within the marina, which includes the area between the land and breakwaters, after construction of the new breakwaters. This survey shall be conducted by a qualified oyster biologist at low tides that expose the maximum amount of substrate possible. Surveys can be conducted at any time of year, but late summer and early fall are optimal because newly settled oysters are detectable. This survey shall occur before any construction within the proposed marina location takes place to establish a baseline condition. If few or no oysters are observed on hard substrates that would remain in place after dredging, no further mitigation is required. 2. If oysters are found at densities at or above 90 oysters per square meter[9] on suitable oyster-settlement substrates that would be removed or in areas where dredging sediment could settle out onto the oysters, a detailed sediment plume modeling study of the proposed marina operation shall be conducted to determine if the operations and maintenance of the marina would generate a substantial plume of sediment. This model shall include the local bathymetry and sediment information, tidal data, and detailed marina information (number and types of boats, etc). The model shall be prepared by a qualified harbor engineer (as approved by the City/Agency) with direct experience in this type of work within San Francisco Bay, prior to issuance of any permits for the construction of features directly associated with the marina. A report documenting modeling methods, input data, assumptions, results, and implications for increased rates of sedimentation shall be prepared and provided to NMFS during the USACE-directed Section 7 and EFH consultation for the marina. If the model demonstrates minimal sediment resuspension that would settle out before reaching sensitive habitats, no further mitigation is required. 3. If the sediment plume reaches sensitive shoreline habitats (substrates that support native oysters), compensatory mitigation shall be provided by the Project Applicant at a ratio recommended by NMFS for the type of habitat adversely affected. The Project Applicant shall retain a qualified oyster biologist (as approved by the City/Agency) to develop an Oyster Restoration Plan that shall be reviewed and approved by the City/Agency. This Plan shall include site selection, substrate installation, and monitoring procedures, and include the following components (unless otherwise modified by NMFS): ■ A suitable site for installation of replacement substrate would be one with adequate daily tidal flow, a location that would not be affected by maintenance dredging or other routine marina maintenance activities, and one that is lacking in appropriate settlement substrate. A location outside of the new breakwaters or in association with any eelgrass mitigation sites would be appropriate.	**LTS/M**

[9] MACTEC Engineering and Consulting, Inc. 2008. *Oyster Point Marina Olympia Oyster Surveys Pre- and Post-Dredging February 2008, Oyster Point Marina, South San Francisco, California*. Prepared for PBS&J; Obernolte. 2009. Personal communication between MACTEC and PBS&J.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		■ Although oysters would settle on a variety of materials, the most appropriate for restoration purposes is oyster shell. This is typically installed by placing the shell into mesh bags that can then be placed in piles on the seafloor of the mitigation site. Enough shell shall be installed under the guidance of a qualified oyster biologist to make up for the loss attributable to the Project. Mitigation shall occur after construction of all in-water elements of the Project within HPS Phase II. ■ The restoration site shall be monitored on a regular basis by a qualified oyster biologist for a minimum of two years, or until success criteria are achieved if they are not achieved within two years. Monitoring shall involve routine checks (bi-monthly during the winter and monthly during the spring and summer) to evaluate settlement, growth, and survival on the mitigation site. Success shall be determined to have been achieved when settlement and survival rates for oysters are not statistically significantly different between the mitigation site and either populations being impacted (if data are available) or nearby established populations (i.e., Oyster Point Marina). **MM BI-18b.2** Implement BMPs to Reduce Impacts of Dredging To Water Quality. BMPs established in Appendix I of the Long-Term Management Strategy (LTMS) for management of disposal of dredge material in San Francisco Bay are designed specifically to minimize spread of contaminants Long-Term Management Strategy (LTMS) outside of dredge areas. All of these elements of the LTMS shall be applied to any proposed dredging or construction activities associated with the Project unless otherwise modified by the USACE, BCDC, or SFRWQCB in permit conditions associated with the proposed dredging activities associated with this Project (same as MM BI-19b.2).	
Impact BI-19a Implementation of the Project at Candlestick Point would not result in impacts to aquatic organisms through the re-suspension of contaminated sediments.	**NI**	No mitigation is required.	**NI**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-19b Implementation of the marina in HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on sensitive aquatic species, identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS, or have a substantial adverse effect on designated EFH, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS, or have a substantial effect on predators that prey on contaminated species or feed on contaminated substrates as a result of routine maintenance dredging or could generate routine increases in turbidity within the marina that would result in the re-suspension of contaminated sediments.	**PS**	**MM BI-19b.1** Work Windows to Reduce Maintenance Dredging Impacts to Fish during Operation of the Marina. According to the Long-Term Management Strategy (LTMS), dredging Projects that occur during the designated work windows do not need to consult with NMFS under the federal *Endangered Species Act* (FESA).[10] The window in which dredging is allowed for the protection of steelhead in the central Bay is June 1 to November 30. The spawning season for the Pacific herring is March 1 to November 30.[11] Therefore, the window that shall be applied to minimize impacts to sensitive fish species (during which dredging activities cannot occur) is March 1 to November 30. **MM BI-19b.2** Implement BMPs to Reduce Impacts of Dredging To Water Quality. BMPs established in Appendix I of the Long-Term Management Strategy (LTMS) are designed specifically to minimize spread of contaminants outside of dredge areas. All of these elements of the LTMS shall be applied to any proposed dredging or construction activities associated with the Project unless otherwise modified by the USACE, BCDC, or the San Francisco Bay Regional Water Quality Control Board in permit conditions associated with the proposed dredging activities associated with this Project (same as MM BI-18b.2).	**LTS/M**

[10] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Implementation Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001.
[11] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Implementation Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001; Appendix F.

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-20a Implementation of the Project at Candlestick Point would not interfere substantially with the movement of resident or migratory bird species by increasing collision hazards and the amount of artificial lighting.	**PS**	**MM BI-20a.1** Lighting Measures to Reduce Impacts to Birds. During design of any building greater than 100 feet tall, the Project Applicant and architect shall consult with a qualified biologist experienced with bird strikes and building/lighting design issues (as approved by the City/Agency) to identify lighting-related measures to minimize the effects of the building's lighting on birds. Such measures, which may include the following and/or other measures, will be incorporated into the building's design and operation. ■ Use strobe or flashing lights in place of continuously burning lights for obstruction lighting. Use flashing white lights rather than continuous light, red light, or rotating beams. ■ Install shields onto light sources not necessary for air traffic to direct light towards the ground. ■ Extinguish all exterior lighting (i.e., rooftop floods, perimeter spots) not required for public safety. ■ When interior or exterior lights must be left on at night, the developer and/or operator of the buildings shall examine and adopt alternatives to bright, all-night, floor-wide lighting, which may include: > Installing motion-sensitive lighting. > Using desk lamps and task lighting. > Reprogramming timers. > Use of lower-intensity lighting. ■ Windows or window treatments that reduce transmission of light out of the building will be implemented to the extent feasible. ■ Educational materials will be provided to building occupants encouraging them to minimize light transmission from windows, especially during peak spring and fall migratory periods, by turning off unnecessary lighting and/or closing drapes and blinds at night. ■ A report of the lighting alternatives considered and adopted shall be provided to the City/Agency for review and approval prior to construction. The City/Agency shall ensure that lighting-related measures to reduce the risk of bird collisions have been incorporated into the design of such buildings to the extent practicable. **MM BI-20a.2** Building Design Measures to Minimize Bird Strike Risk. During design of any building greater than 100 feet tall, the Project Applicant and architect will consult with a qualified biologist experienced with bird strikes and building/lighting design issues (as approved by the City/Agency) to identify measures related to the external appearance of the building to minimize the risk of bird strikes. Such measures, which may include the following and/or other measures, will be incorporated into the building's design. ■ Use non-reflective tinted glass. ■ Use window films to make windows visible to birds from the outside. ■ Use external surfaces/designs that "break up" reflective surfaces. ■ Place bird attractants, such as bird feeders and baths, at least 3 feet and preferably 30 feet or more from windows in order to reduce collision mortality.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		A report of the design measures considered and adopted shall be provided to the City/Agency for review and approval prior to construction. The City/Agency shall ensure that building design-related measures to reduce the risk of bird collisions have been incorporated to the extent practicable.	
Impact BI-20b Implementation of the Project at HPS Phase II would not interfere substantially with the movement of resident or migratory bird species by increasing collision hazards and the amount of artificial lighting.	**PS**	**MM BI-20a.1** and **MM BI-20a.2** would apply to this impact.	**LTS/M**
Impact BI-21a Implementation of the Project at Candlestick Point would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	**PS**	**MM BI-14a** would apply to this impact.	**LTS/M**
Impact BI-21b Implementation of the Project at HPS Phase II would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	**PS**	**MM BI-14a** would apply to this impact.	**LTS/M**
Impact BI-22 Implementation of the Project would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, by the CDFG, USFWS, or NMFS.	**PS**	**MM BI-4a.1, MM BI-4a.2, MM BI-5b.1** through **MM BI-5b.4, MM BI-6a.1, MM BI-6a.2, MM BI-6b, MM BI-7b, MM BI-9b, MM BI-18b.1**, and **MM BI-18b.2** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact BI-23 Implementation of the Project would not have a substantial adverse effect on sensitive natural communities identified in local or regional plans, policies, or regulations by the CDFG, USFWS, or NMFS.	**PS**	**MM BI-5b.1** through **MI-BI-5b.4**, **MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, MM BI-12b.2, MM BI-18b.1**, **MM BI-18b.2**, **MM BI-19b.1**, and **MM BI-19b.2** would apply to this impact.	**LTS/M**
Impact BI-24 Implementation of the Project would not have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	**PS**	**MM BI-4a.1** and **MM BI-4a.2** would apply to this impact.	**LTS/M**
Impact BI-25 Implementation of the Project would not interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site.	**PS**	**MM BI-5b.1** through **MM BI-5b.4, MM BI-20a.1,** and **MM BI-20a.2** would apply to this impact.	**LTS/M**
Impact BI-26 Implementation of the Project would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	**PS**	**MM BI-14a** would apply to this impact. Implementation of **MM BI-7b** would be beneficial to protected trees.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
		SECTION III.O (PUBLIC SERVICES)	
Impact PS-1 Construction activities associated with the Project would not result in a need for new or physically altered facilities in order to maintain acceptable service ratios, response times, or other performance objectives for police protection.	**PS**	**MM PS-1** Site Security Measures During Construction. During site preparation and in advance of construction of individual buildings, fencing, screening, and security lighting shall be provided by the Project Applicant. During non-construction hours the site must be secured and locked, and ample security lighting shall be provided. **MM TR-1** would also apply to this impact.	**LTS/M**
Impact PS-2 Implementation of the Project would not result in a need for new or physically altered facilities beyond those included as part of this Project in order to maintain acceptable service ratios, response times, or other performance objectives for police protection.	**Varies**	Refer to Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), Section III.J (Cultural Resources) Section III.K (Hazards and Hazardous Materials), and Section III.M (Hydrology and Water Quality) for the specific significance conclusions and mitigation measures for construction-related effects.	**Varies**
Impact PS-3 Construction activities associated with the Project would not result in a need for new or physically altered facilities in order to maintain acceptable response times for fire protection and emergency medical services.	**PS**	**MM TR-1** would apply to this impact.	**LTS/M**
Impact PS-4 Implementation of the Project would not result in a need for new or physically altered facilities beyond those included as part of this Project in order to maintain acceptable response times for fire protection and emergency medical services.	**Varies**	Refer to Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), Section III.J (Cultural Resources) Section III.K (Hazards and Hazardous Materials), and Section III.M (Hydrology and Water Quality) for the specific significance conclusions and mitigation measures for construction-related effects.	**Varies**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact PS-5 Construction activities associated with the Project would not affect the provision of school services by decreasing access to school services.	**NI**	No mitigation is required.	**NI**
Impact PS-6 New students associated with implementation of the Project would not require new or expanded school facilities, the construction of which could result in substantial adverse impacts.	**LTS**	No mitigation is required.	**LTS**
Impact PS-7 Construction activities associated with the Project would not affect provision of school services by decreasing access to library services.	**NI**	No mitigation is required.	**NI**
Impact PS-8 Implementation of the Project would not result in an increase in demand for library services that is not met by existing library facilities in the vicinity that have been expanded or updated.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.P (RECREATION)	
Impact RE-1 Construction of the parks, recreational uses, and open space proposed by the Project would not result in substantial adverse physical environmental impacts beyond those analyzed and disclosed in this EIR.	**Varies**	Refer to Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), Section III.J (Cultural Resources and Paleontological Resources) Section III.K (Hazards and Hazardous Materials), and Section III.M (Hydrology and Water Quality) for the specific significance conclusions and mitigation measures for construction-related effects.	**Varies**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact RE-2 Implementation of the Project would not increase the use of existing parks and recreational facilities that would cause the substantial physical deterioration of the facilities to occur or to be accelerated, nor would it result in the need for, new or physically altered park or recreational facilities.	**PS**	**MM RE-2** Phasing of parkland with respect to residential and/or employment generating uses. Development of the Project and associated parkland shall generally proceed in four phases, as illustrated by Figure II-16 (Proposed Site Preparation Schedule) of Chapter II (Project Description) of this EIR. To ensure that within each phase parks and population increase substantially concurrently, development shall be scheduled such that adequate parkland is constructed and operational when residential and employment-generating uses are occupied. The following standards shall be met: ■ No project development shall be granted a temporary certificate of occupancy if the City determines that the new population associated with that development would result in a parkland-to-population ratio within the Project site lower than 5.5 acres per 1,000 residents/population, as calculated by the Agency. ■ For the purposes of this mitigation measure, in order for a park to be considered in the parkland-to-population ratio, the Agency must determine that within 12 months of the issuance of the temporary certificate of occupancy, it will be fully constructed and operational, and, if applicable, operation and maintenance funding will be provided to the Agency.	**LTS/M**
● **Impact RE-3** Implementation of the Project would decrease the size of CPSRA but would not, overall, have an adverse effect on the recreational opportunities offered by that park, nor would it substantially adversely affect windsurfing opportunities at the Project site.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.Q (UTILITIES)	
Impact UT-1 Implementation of the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements.	**LTS**	No mitigation is required.	**LTS**
● **Impact UT-2** Implementation of the Project would not require or result in the construction of new or expanded water treatment facilities. The Project would require the expansion of an auxiliary water conveyance system to provide adequate water supply for firefighting to the Project site.	**PS**	**MM UT-2** Auxiliary Water Supply System. Prior to issuance of occupancy permits, as part of the Infrastructure Plan to be approved, the Project Applicant shall construct an Auxiliary Water Supply System (AWSS) loop within Candlestick Point to connect to the City's planned extension of the off-site system off-site on Gilman Street from Ingalls Street to Candlestick Point. The Project Applicant shall construct an additional AWSS loop on HPS Phase II to connect to the existing system at Earl Street and Innes Avenue and at Palou and Griffith Avenues, with looped service along Spear Avenue/Crisp Road.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact UT-3 Implementation of the Project would not require expansion of existing off-site wastewater conveyance or treatment facilities.	**PS**	**MM UT-3a** would apply to this impact.	**LTS/M**
Impact UT-3a Implementation of the Project at Candlestick Point would not require expansion of existing off-site wastewater conveyance facilities.	**PS**	**MM UT-3a** Wet-Weather Wastewater Handling. Prior to approval of the Project's wastewater infrastructure construction documents for any new development, the Project Applicant shall demonstrate to the San Francisco Public Utilities Commission (SFPUC), in writing, that there will be no net increase in wastewater discharges during wet-weather conditions from within the Project Area boundary to the Bayside System compared to pre-Project discharges. This may be accomplished through a variety of means, including, but not limited to: ■ Temporary on-site retention or detention of flows to the system ■ Separation of all or a portion of the stormwater and wastewater system at Candlestick Point	**LTS/M**
Impact UT-3b Implementation of the Project at HPS Phase II would not require expansion of existing off-site wastewater conveyance facilities.	**PS**	**MM UT-3a** would apply to this impact.	**LTS/M**
Impact UT-4 Implementation of the Project would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.	**LTS**	No mitigation is required.	**LTS**
Impact UT-5 Construction activities associated with the Project, including demolition of existing facilities, would not generate construction-related solid waste that would exceed the capacity of landfills serving the City and County of San Francisco.	**PS**	**MM UT-5a** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact UT-5a Construction at Candlestick Point, including demolition of existing facilities, would not generate construction-related solid waste that would exceed the capacity of landfills serving the City and County of San Francisco.	**PS**	**MM UT-5a** Construction Waste Diversion Plan. The Project Applicant shall submit a Construction Waste Diversion Plan to the Director of the San Francisco Department of the Environment demonstrating a plan to divert at least 75 percent of or more of the total construction and demolition debris produced as the result of the Project (such as wood, metal, concrete, asphalt, and sheetrock) from landfill interment, which is required by the City's Green Building Ordinance. The Plan shall be submitted and approved by the Director of the San Francisco Department of the Environment before the issuance of building permits. This Plan shall include (1) identification of how much material resulting from demolition of existing facilities could be reused on site (e.g., existing asphalt and concrete could be removed, crushed, reconditioned, and reused as base material for new roadways and parking lots); (2) the extent to which materials could be sorted on site (e.g., through piecemeal demolition of selected facilities to extract recyclable materials), (3) the amount of material that would be transported to an off-site location for separation; and (4) the amount of materials that cannot be reused or recycled and would be interred at a landfill, such as the Altamont Landfill in Livermore.	**LTS/M**
Impact UT-5b Construction at HPS Phase II, including demolition of existing facilities, would not generate construction-related solid waste that would exceed the capacity of landfills serving the City and County of San Francisco.	**PS**	**MM UT-5a** would apply to this impact.	**LTS/M**
Impact UT-6 Construction activities associated with the Project would not require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils that would exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste.	**LTS**	No mitigation is required.	**LTS**
Impact UT-6a Construction at Candlestick Point would not require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils that would exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact UT-6b Construction at HPS Phase II would not require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils that would exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste.	**LTS**	No mitigation is required.	**LTS**
Impact UT-7 Implementation of the Project would not generate solid waste that would exceed the capacity of landfills serving the City and County of San Francisco.	**PS**	**MM UT-7a** and **MM UT-7a-1** would apply to this impact.	**LTS/M**
Impact UT-7a Implementation of the Project at Candlestick Point would not generate solid waste that would exceed the capacity of landfills serving the City and County of San Francisco.	**PS**	**MM UT-7a** Site Waste Management Plan. The Project Applicant shall prepare a Site Waste Management Plan (SWMP) in cooperation with the Agency to describe the methods by which the Project shall minimize waste generation not otherwise covered by existing City regulatory policies, with the goal of achieving a diversion rate of at least 72 percent, consistent with the City's existing diversion rate in 2008. The SWMP shall be submitted to the Department of Environment (DOE) for approval prior to the issuance of the first development permit for the Project.	**LTS/M**
Impact UT-7b Implementation of the Project at HPS Phase II would not generate solid waste that would exceed the capacity of landfills serving the City and County of San Francisco.	**PS**	**MM UT-7a** would apply to this impact.	**LTS/M**
Impact UT-8 Implementation of the Project would not generate hazardous waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste.	**LTS**	No mitigation is required.	**LTS**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures

Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact UT-8a Implementation of the Project at Candlestick Point would not generate hazardous waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste.	**LTS**	No mitigation is required.	**LTS**
Impact UT-8b Implementation of the Project at HPS Phase II would not generate hazardous waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste.	**LTS**	No mitigation is required.	**LTS**
Impact UT-9 Implementation of the Project would comply with federal, state, and local statutes and regulations related to solid waste.	**PS**	**MM UT-5a, MM UT-7a.1**, and **MM UT-7a.2** would apply to this impact.	**LTS/M**
Impact UT-10 Implementation of the Project would not require extension of dry utility infrastructure that would exceed the capacity of the services providing such utilities.	**LTS**	No mitigation is required.	**LTS**
		SECTION III.R (ENERGY)	
Impact ME-1 Construction activities associated with the Project would not result in the use of large amounts of energy, or use energy in a wasteful manner.	**LTS**	No mitigation is required.	**LTS**
Impact ME-2 Buildings constructed by the Project would not use large amounts of electricity in a wasteful manner.	**PS**	**MM GC-2, MM GC -3**, and **MM GC-4** would apply to this impact.	**LTS/M**

Table ES-2 Summary of Environmental Effects and Project Requirements/Mitigation Measures			
Impact(s)	*Level of Significance Prior to Mitigation*	*Mitigation Measure(s) and/or Project Requirements*	*Level of Significance After Mitigation*
Impact ME-3 Buildings constructed by the Project would not use large amounts of natural gas in a wasteful manner.	**PS**	**MM GC-2** and **MM GC-3** would apply to this impact.	**LTS/M**
Impact ME-4 Vehicle trips associated with the Project would not use large amounts of energy in a wasteful manner.	**PS**	**MM TR-1** through **MM TR-5** would apply to this impact.	**LTS/M**
		SECTION III.S (GREENHOUSE GAS EMISSIONS)	
Impact GC-1 The Project would not result in a substantial contribution to global climate change by increasing GHG emissions in a manner that conflicts with the state goal of reducing GHG emissions in California to 1990 levels by 2020 (e.g., a substantial contribution to global climate change) or conflicts with San Francisco's Climate Action Plan by impeding implementation of the local GHG reduction goals established by the San Francisco 2008 Greenhouse Gas Reduction Ordinance.	**PS**	**MM GC-1** Plant up to 10,000 net new trees at the Project site and in the community. **MM GC-2** Exceed the 2008 Standards for Title 24 Part 6 energy efficiency standards for homes and businesses would by at least 15 percent. **MM GC-3** Install ENERGY STAR appliances, where appliances are offered by homebuilders. **MM GC-4** Use light emitting diode (LED) based energy efficient street lighting.	**LTS/M**

NI = No Impact
LTS = Less than Significant
LTS/M = Less than Significant with Mitigation
PS = Potentially Significant
S = Significant
SU = Significant and Unavoidable
SU/M = Significant and Unavoidable with Mitigation

Table ES-2a Mitigation Measure Applicability Matrix

Mitigation Measure	*Project*	*Variant 1*	*Variant 2*	*Variant 2A*	*Variant 3*	*Variant 4*	*Variant 5*	*Alternative 2*	*Alternative 3*	*Alternative 4*	*Subalternative 4A*	*Alternative 5*
MM TR-1	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-2	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-4	●	●	●	●	●	●	●	●	n/a	●	●	●
MM TR-6	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-7	●	●	●	●	●	●	●	●	●	n/a	n/a	●
MM TR-8	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-16	●	●	●	●	●	●	●	●	n/a	●	●	●
MM TR-17	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-21.1	●	●	●	●	●	●	●	●	n/a	●	●	●
MM TR-21.2	●	●	●	●	●	●	●	●	n/a	●	●	●
MM TR-22.1	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-22.2	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-23.1	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-23.2	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-24.1	●	●	●	●	●	●	●	●	n/a	n/a	n/a	●
MM TR-24.2	●	●	●	●	●	●	●	●	n/a	n/a	n/a	●
MM TR-25	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-26.1	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-26.2	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-27.1	●	●	●	●	●	●	●	●	n/a	n/a	n/a	●
MM TR-27.2	●	●	●	●	●	●	●	●	n/a	n/a	n/a	●
MM TR-32	●	●	●	●	●	●	●	●	●	●	●	●
MM TR-38	n/a	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a
MM TR-39	n/a	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a
MM TR-46	n/a	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a

Table ES-2a Mitigation Measure Applicability Matrix

Mitigation Measure	*Project*	*Variant 1*	*Variant 2*	*Variant 2A*	*Variant 3*	*Variant 4*	*Variant 5*	*Alternative 2*	*Alternative 3*	*Alternative 4*	*Subalternative 4A*	*Alternative 5*
MM TR-47	n/a	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a
MM TR-51	●	●	●	●	●	●	●	●	●	●	●	●
MM AE-2	●	●	●	●	●	●	●	●	●	●	●	●
MM AE-7a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM AE-7a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM AE-7a.3	●	●	●	●	●	●	●	●	●	●	●	●
MM AE-7a.4	●	●	●	●	●	●	●	●	●	●	●	●
MM AE-7b.1	●	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a
MM AE-7b.2	●	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a
MM W-1a	●	●	●	●	●	●	●	●	●	●	●	●
MM AQ-2.1	●	●	●	●	●	●	●	●	●	●	●	●
MM AQ-2.2	●	●	●	●	●	●	●	●	●	●	●	●
MM AQ-6.1	●	●	●	●	●	●	●	●	●	●	●	●
MM AQ-6.2	●	●	●	●	●	●	●	●	●	●	●	●
MM NO-1a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM NO-1a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM NO-2a	●	●	●	●	●	●	●	●	●	●	●	●
MM NO-7.1	●	n/a	n/a	n/a	●	●	●	●	n/a	n/a	●	n/a
MM CP-1b.1	●	●	●	●	●	●	●	●	●	n/a	n/a	●
MM CP-1b.2	●	●	●	●	●	●	●	●	●	n/a	n/a	●
MM CP-2a	●	●	●	●	●	●	●	●	●	●	●	●
MM CP-3a	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-1a	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-1b	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-2a.1	●	●	●	●	●	●	●	●	●	●	●	●

Table ES-2a Mitigation Measure Applicability Matrix

Mitigation Measure	*Project*	*Variant 1*	*Variant 2*	*Variant 2A*	*Variant 3*	*Variant 4*	*Variant 5*	*Alternative 2*	*Alternative 3*	*Alternative 4*	*Subalternative 4A*	*Alternative 5*
MM HZ-2a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-5a	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-9	●	●	●	●	●	●	●	n/a	●	n/a	●	n/a
MM HZ-10b	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-12	●	●	●	●	●	●	●	●	●	●	●	●
MM HZ-15	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-2a	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-3	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-4a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-4a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-4a.3	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-5a	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-6a	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-10a	●	●	●	●	●	●	●	●	●	●	●	●
MM GE-11a	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-1a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-1a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-6a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-6a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-6b.1	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-6b.2	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-6b.3	●	●	●	●	●	●	●	●	●	n/a	●	●
MM HY-12a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-12a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM HY-14	●	●	●	●	●	●	●	●	●	●	●	●

Table ES-2a Mitigation Measure Applicability Matrix

Mitigation Measure	*Project*	*Variant 1*	*Variant 2*	*Variant 2A*	*Variant 3*	*Variant 4*	*Variant 5*	*Alternative 2*	*Alternative 3*	*Alternative 4*	*Subalternative 4A*	*Alternative 5*
MM BI-4a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-4a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-4c	●	●	●	●	●	●	●	n/a	●	n/a	●	n/a
MM BI-5b.1	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-5b.2	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-5b.3	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-5b.4	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-6a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-6a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-6b	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-7b	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-9b	●	●	●	●	●	●	●	●	●	n/a	●	●
MM BI-12a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-12a.2	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-12b.1	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-12b.2	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-14a	●	●	●	●	●	●	●	●	●	●	●	●
MM BI-18b.1	●	●	●	●	●	●	●	●	●	n/a	●	●
MM BI-18b.2	●	●	●	●	●	●	●	●	●	n/a	●	●
MM BI-19b.1	●	●	●	●	●	●	●	●	●	n/a	●	●
MM BI-19b.2	●	●	●	●	●	●	●	●	●	n/a	●	●
MM BI-20a.1	●	●	●	●	●	●	●	●	●	●	●	●
MM PS-1	●	●	●	●	●	●	●	●	●	●	●	●
MM RE-2	●	●	●	●	●	●	●	●	●	●	●	●
MM UT-2	●	●	●	●	●	●	●	●	●	●	●	●

Table ES-2a Mitigation Measure Applicability Matrix

Mitigation Measure	*Project*	*Variant 1*	*Variant 2*	*Variant 2A*	*Variant 3*	*Variant 4*	*Variant 5*	*Alternative 2*	*Alternative 3*	*Alternative 4*	*Subalternative 4A*	*Alternative 5*
MM UT-3a	●	●	●	●	●	●	●	●	●	●	●	●
MM UT-5a	●	●	●	●	●	●	●	●	●	●	●	●
MM UT-7a	●	●	●	●	●	●	●	●	●	●	●	●
MM GC-1	●	●	●	●	●	●	●	●	●	●	●	●
MM GC-2	●	●	●	●	●	●	●	●	●	●	●	●
MM GC-3	●	●	●	●	●	●	●	●	●	●	●	●
MM GC-4	●	●	●	●	●	●	●	●	●	●	●	●

SOURCE: PBS&J, 2010.

"●" indicates that the mitigation measure is applicable; "n/a" indicates that the mitigation measure is not applicable.

A dot (●) indicates material that has been revised since publication of the Draft EIR. Long changes are indicated with opening dots (❶) and closing dots (❶).

CANDLESTICK POINT–HUNTERS POINT SHIPYARD PHASE II DEVELOPMENT PLAN PROJECT

Final Environmental Impact Report

Volume II: Final EIR (Chapter I to Section III.M)
Administrative Draft 1

San Francisco Redevelopment Agency File No. ER06.05.07
City and County of San Francisco Planning Department File No. 2007.0946E
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San Francisco Redevelopment Agency
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June 2017

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CHAPTER I Introduction

This chapter provides a broad overview of the Candlestick Point–Hunters Point Shipyard Phase II Development Plan Project (Project), in the City and County of San Francisco (City); summarizes the San Francisco Planning Department (Planning Department) and the San Francisco Redevelopment Agency (Agency) planning context for the Project site and surrounding area, including the previous environmental reviews undertaken in connection with related City and Agency plans and approvals; identifies the purpose of the Environmental Impact Report (EIR); summarizes the environmental review process under the *California Environmental Quality Act* (CEQA); and outlines the content of this Environmental Impact Report.

As required by CEQA, this EIR serves to (1) assess the expected direct, indirect, and cumulative impacts of the Project's physical development; (2) identify means of avoiding, minimizing, and/or mitigating potential significant adverse environmental impacts; and (3) evaluate a reasonable range of alternatives to the Project, including the No Project Alternative.

I.A PROJECT OVERVIEW

Overall, the Project would include new plans for the Candlestick Point and Hunters Point Shipyard areas of San Francisco. A detailed description of the Project is provided in Chapter II (Project Description).

The Project proposed by the Project Applicant, Lennar Urban, is a large-scale, mixed-use development proposal for the Candlestick Point and Hunters Point Shipyard Phase II areas of the City. The Project includes a new stadium for the San Francisco 49ers National Football League (NFL) team. The Project encompasses an approximately 702-acre area east of United States Highway 101 (US-101) in the southeast area of the City and occupies the area from India Basin to the approximate western edge of Candlestick Point at Candlestick Cove. This EIR provides a project-level analysis of the environmental impacts of the Project.

I.B HISTORY OF PLANNING PROCESS

I.B.1 Introduction

Over the past three decades, various planning and development activities and associated environmental reviews have been undertaken for the Bayview Hunters Point (BVHP) neighborhood, including Candlestick Point and Hunters Point Shipyard (HPS). This overview explains the context for the development and planning activities proposed for the Project, which are described in detail in Chapter II of this EIR.

The Project is located in two Redevelopment Project Areas governed by two redevelopment plans: the HPS Redevelopment Plan and the BVHP Redevelopment Plan. The HPS Redevelopment Plan includes policies and development controls for the HPS Phase II portion of the Project site, and the BVHP Redevelopment Plan, which addresses the Candlestick Point portion of the Project site. The *San Francisco General Plan* (General Plan) also includes policies pertaining to the Bayview Hunters Point neighborhood.

Additionally, a voter initiative approved in June 2008 (Proposition G) adopted a comprehensive set of development policies and objectives for the Project.

The Project includes amendments of the BVHP Redevelopment Plan and the HPS Redevelopment Plan and Design for Development,[12] as well as revisions to the General Plan, *Planning Code*, and Zoning Map. Chapter II and Section III.B (Land Use and Plans) of this EIR describe the proposed amendments in greater detail.

I.B.2 Redevelopment Plans

Hunters Point Shipyard Redevelopment Plan

HPS served as a working naval shipyard from 1941 to 1974 to provide construction and maintenance support for United States Navy (Navy) ships. After World War II (WWII), HPS served as a submarine maintenance and repair facility and was the site of the Naval Radiological Defense Laboratory. The Navy officially closed the shipyard in 1974, and in 1976, entered into a long-term lease with Triple A Machine Shop, who controlled most of the property until 1986 when the Navy reclaimed the property. In 1989, the US Environmental Protection Agency (EPA) placed HPS on the National Priority List under the federal *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) because of the presence of hazardous materials resulting from past shipyard operations and the operations of the commercial machine shop. In 1991, the Navy, EPA, the California Department of Toxic Substances Control (DTSC), and the San Francisco Bay Area Regional Water Quality Control Board (RWQCB) entered into a Federal Facilities Agreement (FFA) that established a procedural framework and schedule for investigating and remediating conditions at HPS. Additionally, in 1991, HPS was selected and approved for closure and disposition by the Base Realignment and Closure (BRAC) Commission. Operational base closure occurred in April 1994.

In 1997, following an extensive community-led planning effort, the Board of Supervisors approved the HPS Redevelopment Plan (Ordinance No. 285-97). The HPS Redevelopment Plan calls for redevelopment of HPS with a mix of uses, including residential, mixed use, industrial, research and development, maritime industrial, cultural and educational, and open space/recreational. In 1999, the Agency entered into an Exclusive Negotiations Agreement (ENA) with Lennar Urban to prepare a specific development plan to implement the HPS Redevelopment Plan and negotiate transaction documents for the conveyance, management, and redevelopment of HPS. As required by CEQA for base closure actions, the San Francisco Planning Commission (Planning Commission), the San Francisco Redevelopment Agency Commission (Agency Commission), and the San Francisco Board of Supervisors (Board of Supervisors) prepared and certified the Hunters Point Shipyard Reuse Plan Final EIR (Case No. 1994.061E) on February 8, 2000.[13] The Final EIR analyzed the closure and disposal of HPS by the Navy and the proposed Reuse Plan (i.e., the HPS Redevelopment Plan) for the site.

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[12] The 1997 HPS Redevelopment Plan establishes the land use standards for development in the Redevelopment Project Area. The 2004 Design for Development document outlines the design objectives, development standards, and urban design guidelines for projects developed in the Redevelopment Project Area.

[13] On June 16, 2000, the Navy issued the *Final Environmental Impact Statement (EIS) for Disposal and Reuse of Hunters Point Shipyard* pursuant to the *National Environmental Policy Act*. The Navy published the Record of Decision for the EIS in the Federal Register on November 20, 2000. The Navy is preparing a Supplemental EIS analyzing the proposed changes to

In 2003, the Agency Commission and the Navy entered into a Conveyance Agreement setting out the terms and conditions for transferring HPS to the Agency. The Conveyance Agreement envisioned that the Navy would transfer the property in phases as the Navy completed its environmental remediation. The Agency and Lennar Urban agreed that development would be phased to correspond to the receipt of parcels from the Navy, and that the parties would enter into a series of disposition and development agreements (DDAs) and related transaction documents to govern each phase of development.

On December 2, 2003, the Agency Commission approved and authorized the execution of the first set of transaction documents with Lennar Urban, including the HPS Phase I Disposition and Development Agreement (Phase I DDA) for a portion of HPS identified as Parcel A-Prime and Parcel B-Prime. In connection with the approval of the Phase I DDA, the City prepared an Addendum to the Hunters Point Shipyard Reuse Plan Final EIR (Addendum No. 1, Case No. 2003.0241E). Addendum No. 1 analyzed certain revisions to the development program reviewed in the Final EIR, including changes in the location and mix of uses, height increases, and updated and detailed information about the development design. The Phase I development program included 1,600 residential units, commercial space, community-serving facilities, an Interim African Marketplace, research and development/office space, support retail space, and necessary infrastructure improvements.

In accordance with Navy procedures for complying with CERCLA, the Navy issued a Finding of Suitability to Transfer (FOST) for Parcel A-Prime in October 2004, a document indicating that the Navy found the property met the CERCLA requirements for transfer. The EPA, DTSC, and the RWQCB concurred with this conclusion, along with the City's Department of Public Health, and the Agency accepted the title in December 2004. On April 5, 2005, the Agency transferred the portions of Parcel A-Prime to be privately developed to Lennar Urban to construct the infrastructure improvements required under the Phase I DDA.

Subsequently, the transfer of Parcel B-Prime from the Navy to the Agency was delayed. As a result, on October 17, 2006, the Agency Commission approved an amendment to the Phase I DDA to remove Parcel B-Prime from the Phase I development and to shift the entitled residential units from Parcel B-Prime to Parcel A-Prime. Addendum No. 2 to the Hunters Point Shipyard Reuse Plan Final EIR analyzed those development plan revisions. Additionally, Addendum No. 2 analyzed a variety of changes to the Design for Development standards, which were approved in 2004, such as dwelling unit density standards, height and bulk limits, off-street loading, lot sizes, street design, and other similar topics. The approved development plan for Phase I includes infrastructure, approximately 1,600 residential units, and 132,000 square feet of commercial space on approximately 75 acres.

In May 2007, the Agency and Lennar Urban amended and restated the ENA (referred to as the Phase II ENA) setting forth the terms and conditions under which the Agency and Lennar Urban would negotiate one or more DDAs and related transaction documents for the remainder of HPS and Candlestick Point. The portions of HPS that are not included in Phase I remain under the jurisdiction of the Navy and are referred to in this EIR as Phase II. HPS Phase II and Candlestick Point collectively form the Project site.

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the reuse plan reflected in the Project covered in this EIR. The Draft Supplemental EIS is expected to be published in 2010.

Bayview Hunters Point Redevelopment Plan (formerly the Hunters Point Redevelopment Plan)

The Hunters Point Redevelopment Plan (HPRP) was adopted in 1969 and amended in 1994 and 2006. The original plan encompassed 137 acres that were formerly occupied by wartime housing. The original HPRP's goals included creating a mixed-income neighborhood through construction of new single- and multi-family affordable housing (for renters and owners), new community facilities, parks, schools, new streets, and utilities.

In 1997, Agency staff began working with the Bayview Hunters Point Project Area Committee (PAC) on the development of the Bayview Hunters Point Community Revitalization Concept Plan (Concept Plan). In November 2000, the PAC approved the Concept Plan, which serves as a vision statement for the community to guide the redevelopment planning process. The Concept Plan contains goals and objectives for revitalization of the area. This planning effort led to the 2006 amendment of the HPRP.

The 2006 amendment of the HPRP provided the implementation tools to meet many of the goals included in the Concept Plan. This amendment renamed the plan the Bayview Hunters Point Redevelopment Plan (Ordinance No. 113-06). The amendment also added 1,438 acres of the BVHP Survey Area, or Project Area B, to the existing 137-acre Project Area (Project Area A). The resulting BVHP Redevelopment Project Area consists of 1,575 acres. The primary redevelopment programs of the BVHP Redevelopment Plan include an Economic Development Program, Affordable Housing Program, and a Community Enhancements Program. Due to the large size and the diversity of Bayview Hunters Point, the BVHP Redevelopment Project Area is divided into seven Economic Development Activity Nodes. The Candlestick Point portion of the Project site is within the Candlestick Point Activity Node. The Alice Griffith public housing site, also included in the Project site, is within the South Basin Activity Node. The BVHP Redevelopment Plan is supported by the Bayview Hunters Point Redevelopment Projects and Rezoning Final EIR (BVHP Final EIR, Case No. 1996.546E), certified by the Agency Commission and the Planning Commission in March 2006.

I.B.3 The San Francisco General Plan

Bayview Hunters Point Area Plan

The Bayview Hunters Point Area Plan (formerly, the South Bayshore Area Plan) is an element and area plan of the General Plan. It covers the southeastern section of the City, bounded by Cesar Chavez Street to the north, US-101 to the west, the San Francisco Bay to the east, and the San Francisco county line to the south, exclusive of HPS. Candlestick Point is within the geographic boundaries of the BVHP Area Plan. In March 2006, the Planning Commission adopted amendments to the BVHP Area Plan that reflect themes and goals included in the Concept Plan prepared by the Agency and the BVHP PAC for the Bayview Hunters Point area.

The BVHP Area Plan supports revitalization efforts in Bayview Hunters Point. It contains policies and objectives addressing Land Use, Transportation, Housing, Commerce, Industry, Recreation and Open Space, Urban Design, Community Facilities and Services, and Public Safety.

Propositions

Propositions D and F—San Francisco 49ers Stadium Development Retail/Entertainment Center

In June 1997, San Francisco voters adopted two measures—Proposition D and Proposition F—providing for the development of a new state-of-the-art stadium for the San Francisco 49ers football team and an entertainment/retail shopping center at Candlestick Point. Proposition F amended the General Plan, *Planning Code*, and Zoning Map, and established the Candlestick Point Special Use District to accommodate the development of a stadium suitable for professional football and a shopping and entertainment center with open space and related parking facilities as principal uses, as well as other conditional uses, such as residential, subject to the approval of the Planning Commission. Proposition D authorized the City to use lease financing to borrow up to $100 million toward building a new stadium at Candlestick Point.

In late 2006, the San Francisco 49ers decided that the proposed stadium did not meet their needs. A site for a new stadium at Hunters Point Shipyard was identified and pursuant to a February 2007 Board of Supervisors approved resolution urging the Agency to work with the City to amend its exclusive negotiating agreement with Lennar to combine the Candlestick Point and the Hunter Point Shipyard redevelopment projects, the Agency's ENA with Lennar Urban to develop Hunters Point Shipyard was amended to include Candlestick Point as one integrated Project. In May 2007, the Board of Supervisors and the Mayor endorsed a Conceptual Framework for the planning and development of the Project site, which included HPS Phase II and Candlestick Point.

Proposition P (approved by the voters of San Francisco on November 7, 2000) called upon the Navy to remediate HPS to the highest levels practical to ensure flexible reuse of the property. The Board of Supervisors subsequently passed Resolution 634-01, adopting Proposition P as official City policy and urging the Navy and USEPA to take actions to implement Proposition P. The Resolution (1) recognizes that the unrestricted cleanup standard called for in Proposition P identifies a cleanup level acceptable to the community; (2) urges the Navy and FFA regulatory agencies not to rely on barriers to protect future occupants and the public from exposure to pollution, unless other remedies are technically infeasible, and (3) urges the Navy to clean up the Shipyard in a manner fully consistent with the Reuse Plan and with remedies that do not make implementation of the Reuse Plan economically infeasible.

Proposition P states a desired result that the Navy and regulators achieve in carrying out the cleanup of the Shipyard. Proposition P and the subsequent Board resolution are not directly applicable to the Project because the Navy cleanup, and decisions made by the regulators about the cleanup, is not part of the Project, Adoption and implementation of the Project would not be inconsistent with, and would not change, the City's stated desire that the Navy clean up HPS in a manner that allows flexible reuse, does not rely on barriers to protect the public from exposure unless other remedies are technically infeasible, is consistent with the Reuse Plan and does not render the Reuse Plan economically infeasible to implement. Proposition P is a general statement of policy and addresses the type of clean-up remedy that the Navy should select and the regulators should approve for HPS. The ROD for a parcel sets forth the selected remedy. Under the early transfers envisioned at the Shipyard, all radiological cleanup will be completed and RODs issued. The Navy already has issued RODs for Parcels B, D-1, UC-1, UC-2, and G. Further, the Navy already has conducted substantial remediation. Thus, by the time the Navy offers parcels being

considered for early transfer to the Agency (with concurrence of USEPA and the Governor of California) the remedy already will have been selected and significant remediation completed. In the case of the first early transfer being considered—for Parcels B and G, the Navy also will have prepared (and the regulators will have approved) the remedial design documents.

Proposition G

In June 2008, and in response to the Conceptual Framework, the San Francisco voters approved Proposition G, which is called the Bayview Jobs, Parks, and Housing Initiative (refer to Appendix B [Proposition G]). Proposition G repealed Propositions D and F. Proposition F had established a special use district for the Project site, whereas Proposition G proposed that new zoning be established along with a land use program. Proposition G also established City policy to encourage, subject to public input and the environmental review process, the timely development of Candlestick Point and HPS with a mixed-use project including *(i)* over 300 acres of public park and open space improvements; *(ii)* approximately 10,000 homes for sale or rent; *(iii)* about 700,000 square feet of retail uses; *(iv)* about 2,150,000 square feet of "green" office, science and technology, research and development, and industrial uses; *(v)* a possible arena or other public performance site; *(vi)* a site in HPS for a new stadium if the San Francisco 49ers and the City determine in a timely manner that the stadium is feasible; and *(vii)* additional "green" office, science and technology, research and development, and industrial space, and/or additional housing if a new stadium is not built.

Proposition G established City policy that the integrated mixed-use project must be consistent with the following objectives:

- The integrated development should reunify Candlestick Point and HPS with the larger BVHP neighborhood and should protect the character of the Bayview for its existing residents.
- The integrated development should produce tangible community benefits for the BVHP neighborhood and the City.
- The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourage the rebuilding of Alice Griffith Public Housing.
- The integrated development should incorporate environmental sustainability concepts and practices.
- The integrated development should encourage the San Francisco 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and supporting infrastructure.
- The integrated development should be financially sound, with or without a new stadium.

All of the objectives of Proposition G and the Project are discussed further in Chapter II.

I.C PURPOSE OF THE EIR

This EIR has been prepared by the Agency and the City (Planning Department) as co-lead agencies for the Project, in conformance with the substantive and procedural requirements of CEQA and the CEQA

Guidelines (as amended through 2007),[14] Agency CEQA guidelines, Chapter 31 of the *San Francisco Administrative Code*, and Planning Department CEQA guidelines. In accordance with *Public Resources Code* (PRC) Section 21002.1, the purpose of this EIR is to identify the significant environmental impacts of the Project, to identify alternatives to the Project, and to indicate the manner in which those significant effects could be mitigated or avoided. As defined in CEQA Guidelines Section 15382, a "significant effect on the environment" is:

> … a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant.

This EIR evaluates the development Project's environmental effects at a project level of detail and examines all phases of the Project, including planning, construction, and operation, as well as the direct, indirect, and cumulative impacts that might result. The Candlestick Point-Hunters Point Shipyard Phase II EIR is a Redevelopment Plan EIR pursuant to CEQA Guidelines Section 15180 and a project EIR pursuant to CEQA Guidelines Section 15161. The CEQA "Project" includes the proposed Candlestick Point-Hunters Point Shipyard Phase II Development project, the proposed amendments of the Bayview Hunters Point and Hunters Point Shipyard Redevelopment Plans, and the proposed amendments of the San Francisco *General Plan* and the San Francisco *Planning Code*.

It is anticipated that each discretionary approval related to the implementation of the Project would rely on this EIR and would not require preparation of subsequent environmental documentation, unless otherwise required by CEQA pursuant to PRC Section 21166 and CEQA Guidelines Sections 15162 through 15164. Anticipated approvals for the Project are included in Chapter II.

As stated in Section 15121(a) of the CEQA Guidelines, an EIR is an "informational document" intended to inform the Board of Supervisors, Agency Commission, Planning Commission, other public agencies with discretionary authority over aspects of the Project, the general public, the local community, and other organizations, entities, and interested persons of the scope of the Project, significant environmental effects of the Project, possible measures to avoid or minimize the significant effects, and a reasonable range of feasible alternatives to the Project. The Agency and the City must consider the information in this EIR and make certain findings with respect to each significant effect identified in this EIR. The Agency and the City will use the information in the EIR, along with other information available through the public review processes, to determine whether to approve, modify, or disapprove the Project, or a Project alternative, and to specify applicable environmental mitigation measures as part of the Project approvals.

This EIR has been prepared in accordance with CEQA (PRC Section 21000 et seq.), the CEQA Guidelines (*California Code of Regulations*, Title 14, Section 15000 et seq.), and the City's and Agency's local CEQA procedures. The determination that the Agency and the City are the "lead agencies" is made in accordance with Section 15367 of the CEQA Guidelines, which defines the lead agency as the public agency with the principal responsibility for carrying out or approving a project and conducting the environmental review.

[14] *California Environmental Quality Act*, (*Pub. Res. Code* Sec. 21000 et seq.) and the CEQA Guidelines (*Cal. Code Regs.* Sec. 15000 et seq.).

As provided in both CEQA and the CEQA Guidelines, public agencies are charged with the duty to substantially lessen or avoid significant environmental effects where feasible for projects subject to CEQA (refer to PRC Section 21004, CEQA Guidelines Sections 15002(a)(3) and 15021(a)(2)). In discharging this duty, the public agency has an obligation to balance a variety of public objectives, taking into account economic, environmental, and social issues. The EIR is an informational document that informs public agency decision-makers and the general public of the significant environmental effects and the ways in which those impacts can be reduced to less-than-significant levels, either through the imposition of mitigation measures or through the implementation of specific alternatives to the project as proposed. In a practical sense, EIRs function as a technique for fact-finding, allowing an applicant (e.g., Lennar Urban), the public, and agency staff an opportunity to collectively review and evaluate baseline conditions and project impacts through a process of full disclosure. Additionally, the EIR provides the primary source of environmental information for the lead agency to consider when exercising any permitting authority or approval power directly related to implementation of a Project.

I.D ENVIRONMENTAL REVIEW PROCESS

Lennar Urban filed an Environmental Evaluation application (EE application) with the Planning Department on August 27, 2007. The filing of the EE application initiated the environmental review process as outlined below. The EIR process provides an opportunity for the public to review and comment upon the Project's potential environmental effects and to further inform the environmental analysis. As a first step in complying with the procedural requirements of CEQA, the Notice of Preparation (NOP) process was used to determine whether any aspect of the Project, either individually or cumulatively, may cause a significant effect on the environment and, if so, to narrow the focus (or scope) of the environmental analysis.

The Agency and City filed the NOP with the California Office of Planning and Research, State Clearinghouse, as an indication that an EIR would be prepared. In turn, the State Clearinghouse distributed the NOP to public agencies and interested parties for a 30-day public review period. The purpose of the public review period was to solicit comments on the scope and content of the environmental analysis contained in the Draft EIR. In addition, in order to solicit further comments on the scope and content of the environmental analysis to be included in the EIR, the Agency and City held two public scoping meetings.

I.D.1 Notice of Preparation and Summary of Comments

The Agency and the City distributed the NOP on August 31, 2007, announcing its intent to prepare and distribute an EIR (refer to Appendix A [Notice of Preparation (NOP) and NOP Comments]). The NOP was distributed to responsible or trustee agencies in accordance with Section 15082 of the CEQA Guidelines. In addition, the NOP was also sent to organizations, companies, and/or individuals that the Agency and the City believed might have an interest in the Project. A copy of the NOP is included in Appendix A1 to this EIR. The NOP included the India Basin Shoreline, which would be evaluated on a programmatic basis, as part of the Project; however, since publication of the NOP, the Agency and the City decided to remove the India Basin Shoreline area from the Project and will analyze development in that area as part of a separate EIR.

In response to the NOP, nine comment letters were submitted to the City by public agencies, organizations, and individuals. The NOP comment letters are summarized below:

- **California Department of Transportation (Caltrans)** provided summary comments pertaining to traffic volume and congestion on the State Highway System and recommended that a traffic impact analysis be prepared.
- **California Public Utilities Commission (CPUC)** provided comments identifying CPUC as a responsible agency if new at-grade rail crossings were proposed. The letter suggested that the unused railroad tracks leading to the Shipyard be removed as mitigation for development in the area.
- **California Department of Parks and Recreation** provided summary comments for the analysis of the Project in relation to the Candlestick Point State Recreation Area (CPSRA) and consistency with the adopted CPSRA General Plan. The comments also addressed public access to the shoreline, hazardous materials, proposed transportation improvements, and stormwater.
- **San Francisco Bay Conservation and Development Commission (BCDC)** provided a comment regarding BCDC's jurisdiction over the Project, including the 100-foot BCDC jurisdictional band and the BCDC priority use areas identified in the Bay Plan. The Bay Plan identifies HPS as a "Port priority" use area and Candlestick Point as "Waterfront Park" and "Beach" priority areas.
- **The Bay Trail Project** provided summary comments on the proposed extension of the Bay Trail. The Bay Trail Project is a nonprofit organization administered by the Association of Bay Area Governments and is responsible for implementation of the Bay Trail Plan. The comments addressed consistency of the proposed Bay Trail improvements with the Bay Trail Plan and the relationship of the trail with proposed transportation improvements.
- **City of Brisbane** provided comments regarding the characterization of the US-101/Geneva/Harney interchange and Geneva Avenue extension and analysis of the Project in relation to future transportation improvements necessary to serve the Project.
- **Literacy for Environmental Justice** provided comments regarding the cleanup of the HPS, and stated that such actions must be to residential standards.
- **Arc Ecology** provided comments regarding Project alternatives, social and economic impacts, and the level of environmental review that was proposed for the Project. Additional concerns focused on the content of the NOP.
- An **individual** resident in Bayview Hunters Point provided comments regarding accessibility to the waterfront, aesthetics and neighborhood character of the waterfront area, and traffic.

The Agency and the City held two public scoping meetings for the EIR, on September 17, 2007, and September 25, 2007. The scoping meetings provided the public and affected governmental agencies with an opportunity to present environmental concerns regarding the Project. Agencies or interested persons that did not respond during the NOP public review period or the Scoping Meetings will have an opportunity to comment during the public review period for the EIR, as well as at scheduled hearings on the Project. The NOP and the NOP comment letters are included in Appendix A.

The Draft EIR has considered the CEQA-related concerns listed above, as well as other concerns raised through the scoping process. These issues are addressed in Chapter III (Environmental Setting, Impacts, and Mitigation Measures).

I.D.2 Public Review of the Draft EIR

In accordance with CEQA, the CEQA Guidelines, Chapter 31 of the *San Francisco Administrative Code*, and the Notice of Preparation, the EIR reviews the potential environmental effects of the Project in Section III.B through Section III.T of Chapter III of the EIR, which includes:

- Land Use and Plans (Section III.B)
- Population, Housing, and Employment (Section III.C)
- Transportation and Circulation (Section III.D)
- Aesthetics (Section III.E)
- Shadows (Section III.F)
- Wind (Section III.G)
- Air Quality (Section III.H)
- Noise (Section III.I)
- Cultural and Paleontological Resources (Section III.J)
- Hazards and Hazardous Materials (Section III.K)
- Geology and Soils (Section III.L)
- Hydrology and Water Quality (Section III.M)
- Biological Resources (Section III.N)
- Public Services (Section III.O)
- Recreation (Section III.P)
- Utilities (Section III.Q)
- Energy (Section III.R)
- Greenhouse Gas Emissions (Section III.S)

This EIR evaluates the direct, indirect, and cumulative impacts resulting from planning, construction, and operation of the Project in accordance with the provisions set forth in CEQA and the CEQA Guidelines. Also, in preparing the EIR, pertinent City policies and guidelines, existing EIRs, and background documents prepared by the City or the Applicant were evaluated for applicability to the Project and used, where appropriate. References are provided throughout this EIR as footnotes.

- Following publication of the Draft EIR, there was a public review and comment period to solicit public comment on the information presented in the Draft EIR. The public review period was originally scheduled from November 12, 2009, through December 28, 2009. Additionally, the Agency Commission and the Planning Commission held public hearings on this Draft EIR. The first Agency Commission hearing was held on December 15, 2009, in Room 416. At the conclusion of that hearing, a second Agency Commission hearing was scheduled for January 5, 2010. In addition, the Agency Commission voted to extend the comment period to January 12, 2010. The Planning Commission hearing was held on December 17, 2009, in Room 400 and the Planning Commission concurred with the Agency Commission's decision to extend the comment period to January 12, 2010. Both hearing rooms are located in City Hall, Dr. Carlton B. Goodlett Place, beginning at 1:30 P.M. or later (call (415) 588-6422 the week of the hearing for a recorded message giving a more specific time).

In addition, readers are invited to submit written comments on the Draft EIR. Written comments should be submitted to:

Stanley Muraoka
Environmental Review Officer
San Francisco Redevelopment Agency
One South Van Ness Avenue, Fifth Floor
San Francisco, CA 94103

or

Bill Wycko
Environmental Review Officer
City and County of San Francisco
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

The documents referenced in this Draft EIR are available for public review by appointment at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor, San Francisco, CA, 94103, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103. The EIR will be posted for public review at http://www.sfplanning.org and www.sfgov.org/sfra.

I.D.3 Final EIR and EIR Certification

Following the close of the public review and comment period, the Agency and the City will prepare and publish a document titled "Comments and Responses," which will contain a summary of all written and recorded oral comments on this Draft EIR and written responses to those comments, along with copies of the letters received, a transcript of the public hearings, and any necessary revisions to the EIR. This Draft EIR and the Comments and Responses document will constitute the Final EIR. The Agency Commission and the Planning Commission, in an advertised public meeting(s), will consider the documents and then, if found adequate, certify the Final EIR as completed in compliance with CEQA and the CEQA Guidelines.

I.D.4 CEQA Findings for Project Approval

Where a certified EIR identifies significant environmental effects, CEQA Guidelines Sections 15091 and 15092 require the adoption of findings prior to approval of a project. According to PRC Section 21081, the Lead Agency must make specific Findings of Fact (Findings) before approving a Project for which a Final EIR has been certified that identifies one or more significant effects on the environment that may result from that Project. The purpose of the Findings is to establish the connection between the contents of the Final EIR and the action of the Lead Agency with regard to approval of the Project, if the Lead Agency approves the Project. Prior to approval of a Project, one of three findings must be made, as required by PRC Sections 21081 and 15091 of the CEQA Guidelines:

- Changes or alterations have been required in, or incorporated into, the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR
- Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the Final EIR

If the Agency and City were to approve the Project, despite significant impacts identified in the Final EIR that cannot be mitigated, if any, the Agency and City must state in writing the reasons for its actions, under CEQA Guidelines, Section 15093. Those findings, called a Statement of Overriding Considerations, must be supported by substantial evidence in the record, and are used to explain the specific reasons why the benefits of a Project make its unavoidable environmental effects acceptable.

I.D.5 Mitigation Monitoring and Reporting Program

At the time of project approval, CEQA and the CEQA Guidelines require lead agencies to adopt a reporting and mitigation monitoring program, which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. (CEQA Section 21081.6; CEQA Guidelines Section 15097) This Draft EIR identifies and presents mitigation measures that would form the basis of such a monitoring and reporting program. Any measures adopted by the Agency and City as conditions for approval of the Project would be included in the Mitigation Monitoring and Reporting Program (MMRP).

I.E ORGANIZATION OF THE EIR

This EIR has been organized for ease of use and reference. To help the reader locate information of particular interest, a brief summary of the contents of the EIR include:

- **Summary**—The Summary provides a brief Project Description, a synopsis of Project objectives, and a summary table of Project impacts and mitigation measures. The Summary also presents Project alternatives and variants and their comparative environmental effects.
- **Chapter I (Introduction)**—The Introduction provides an historical overview of the planning context for the Project, the purpose of the EIR, a summary of the environmental and public review process, and a brief outline of this document's organization.
- **Chapter II (Project Description)**—The Project Description provides a detailed description of the Project, including its location, the existing site land use characteristics and history, Project objectives, Project components and characteristics, including the land use plan, green building concepts, parks and open space plan, transportation and infrastructure improvements, and community benefits. The Project Description also includes the development schedule (including anticipated construction activities), and approval requirements (or intended uses of the EIR), and technical, economic, and environmental characteristics of the Project.
- **Chapter III (Environmental Setting, Impacts, and Mitigation Measures)**—This chapter provides analysis for the nineteen topics previously identified. Each environmental topic contains a description of the environmental setting (or existing conditions), regulatory framework, and project-level and cumulative impacts. Each impact discussion includes the significance criteria used to determine the nature or magnitude of environmental impacts, significance conclusions, and feasible mitigation measures that would avoid, minimize, or mitigate significant or potentially significant environmental impacts, if required.
- **Chapter IV (Project Variants)**—This chapter describes six variants to the Project. These variants are also evaluated at a project-level in this chapter as follows:
  - > Variant 1: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—Research and Development Variant

- > Variant 2: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—Housing Variant
- > Variant 2A: San Francisco 49ers move outside the Project area (no football stadium constructed at HPS Phase II)—Housing/R&D Variant
- > Variant 3 (Tower Variants 3A, 3B, and 3C: Four Candlestick Point tower variants would have the same land use program and overall description as with the Project, but would have different locations, massings, and heights for residential towers at Candlestick Point.
- > Variant 4: A utilities variant would include an automated solid waste collection system, decentralized wastewater treatment, and district energy.
- > Variant 5: Shared stadium where both the San Francisco 49ers and Oakland Raiders would play at the stadium at HPS Phase II

- **Chapter V (Other CEQA Issues)**—As required by Section 15126.2 of the CEQA Guidelines, this chapter summarizes significant and unavoidable environmental impacts, irreversible changes to the environment, and growth-inducing impacts of the Project. This chapter also addresses agricultural resources and mineral resources, which are "Effects Not Found to Be Significant." In addition, this chapter also addresses secondary land use effects, including urban decay.
- **Chapter VI (Alternatives)**—This chapter analyzes alternatives to the Project, including the required No-Project Alternative, compares their environmental effects to those of the Project, and identifies the environmentally superior alternative. Alternatives evaluated in this chapter include the following:
  - > Alternative 1: No Project
  - > Alternative 2: CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
  - > Alternative 3: Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
  - > Alternative 4: Reduced CP-HPS Phase II Development, Historic Preservation, No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
    - ○ Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation
  - > Alternative 5: Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and Without the Yosemite Slough Bridge
- **Chapter VII (EIR Preparers and Persons and Organizations Contacted)**—This chapter identifies the individuals responsible for the preparation of this EIR, as well as the persons and organizations contacted during preparation of the EIR.
- **Chapter VIII (Acronyms/Abbreviations and Glossary)**—This chapter provides definitions for the acronyms and abbreviations that are used throughout the EIR. It also provides definitions for key words or phrases used throughout the EIR.
- **Appendices**—The technical appendices to the EIR, which include studies completed in support of the EIR, are bound under separate cover.

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CHAPTER II **Project Description**

II.A PROJECT OVERVIEW

The Candlestick Point–Hunters Point Shipyard Phase II Development Plan Project (Project) is located on approximately 702-acre area east of US-101 in the southeast area of the City and County of San Francisco (City). It occupies the waterfront area from south of India Basin to Candlestick Cove. Figure II-1 (Project Location) illustrates the regional location of the Project and the location of the Project within the City.

The Project proposed by Lennar Urban includes a mixed-use community with a wide range of residential, retail, office, research and development, civic and community uses, and parks and recreational open space. A major component would be a new stadium for the San Francisco 49ers National Football League (NFL) team. Additionally, new transportation and utility infrastructure would serve the Project including a bridge across Yosemite Slough. The description of the Project is organized under two major sub-components: Candlestick Point (CP) and Hunters Point Shipyard Phase II (HPS Phase II).

II.B PROJECT LOCATION

II.B.1 Regional Location

Candlestick Point and HPS Phase II are located on approximately 702 acres in the southeastern portion of San Francisco; taken together, they are bordered by major features such as India Basin on the north; the Executive Park area and San Mateo County line on the south; Bayview Hill, the BVHP neighborhood, Yosemite Slough, and Hunters Point Hill on the west; and San Francisco Bay on the north and the east. Figure II-2 (Project Site and Context) illustrates the Project boundaries. Table II-1 (Project Site Areas) presents the acreage of the Project site.

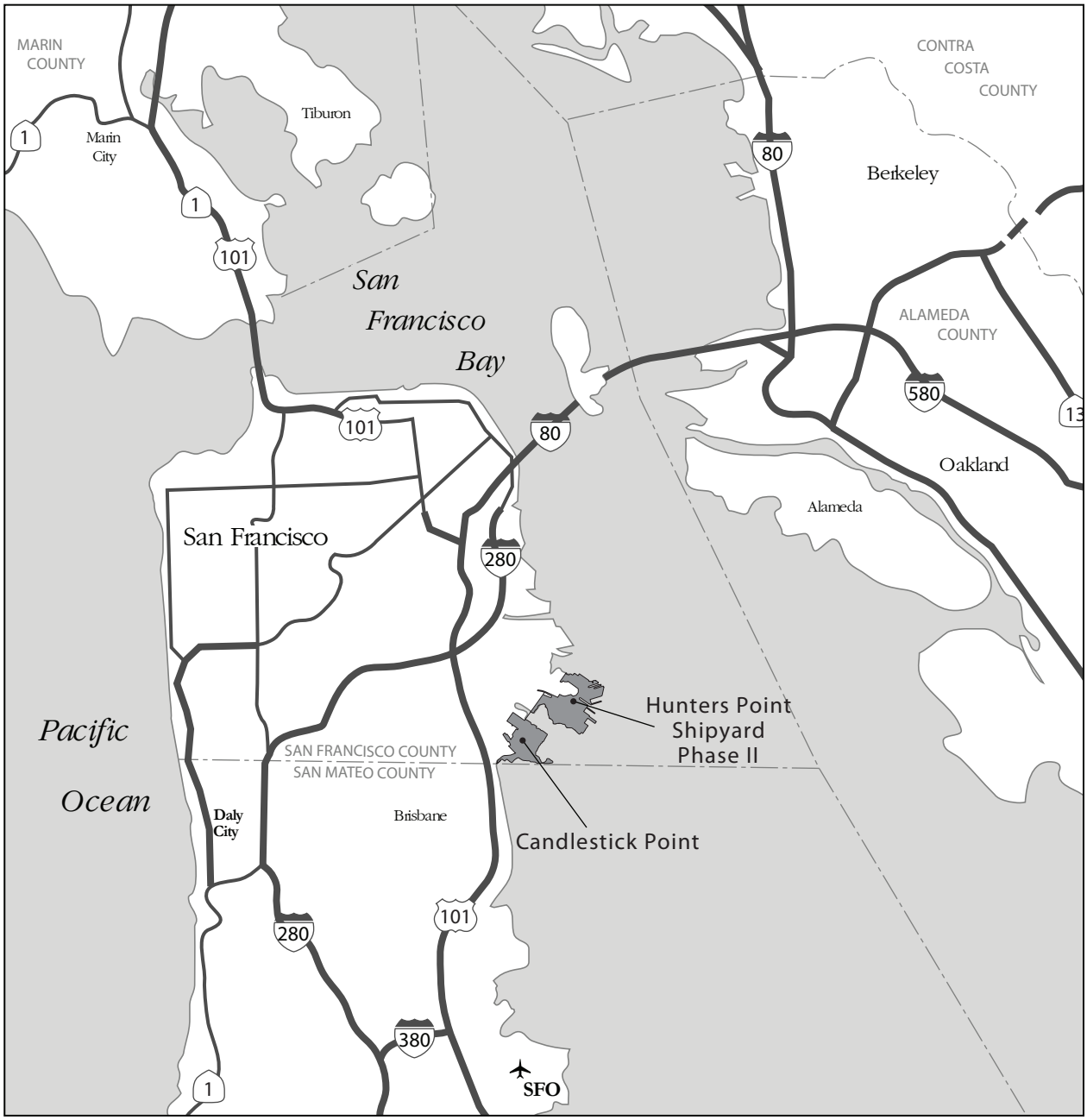
Table II-1 Project Site Areas

Development Area	*Acres*
Candlestick Point	281
Hunters Point Shipyard Phase II	421
Total	***702***

SOURCE: Lennar Urban, 2009.
Candlestick Point includes the approximately 120.2-acre Candlestick Point State Recreation Area.

II.B.2 Candlestick Point

Candlestick Point is immediately east of Executive Park, with the BVHP neighborhood to the north, HPS Phase II to the northeast, and the Candlestick Point State Recreation Area (CPSRA) along the Bay frontage generally to the east, as shown in Figure II-2. Candlestick Point is generally bounded by Hawes Street to the northwest and Harney Way to the southwest, and the Candlestick Cove and South Basin areas of the Bay area to the south and east, respectively.



SOURCE: Clement Designs, 2008.

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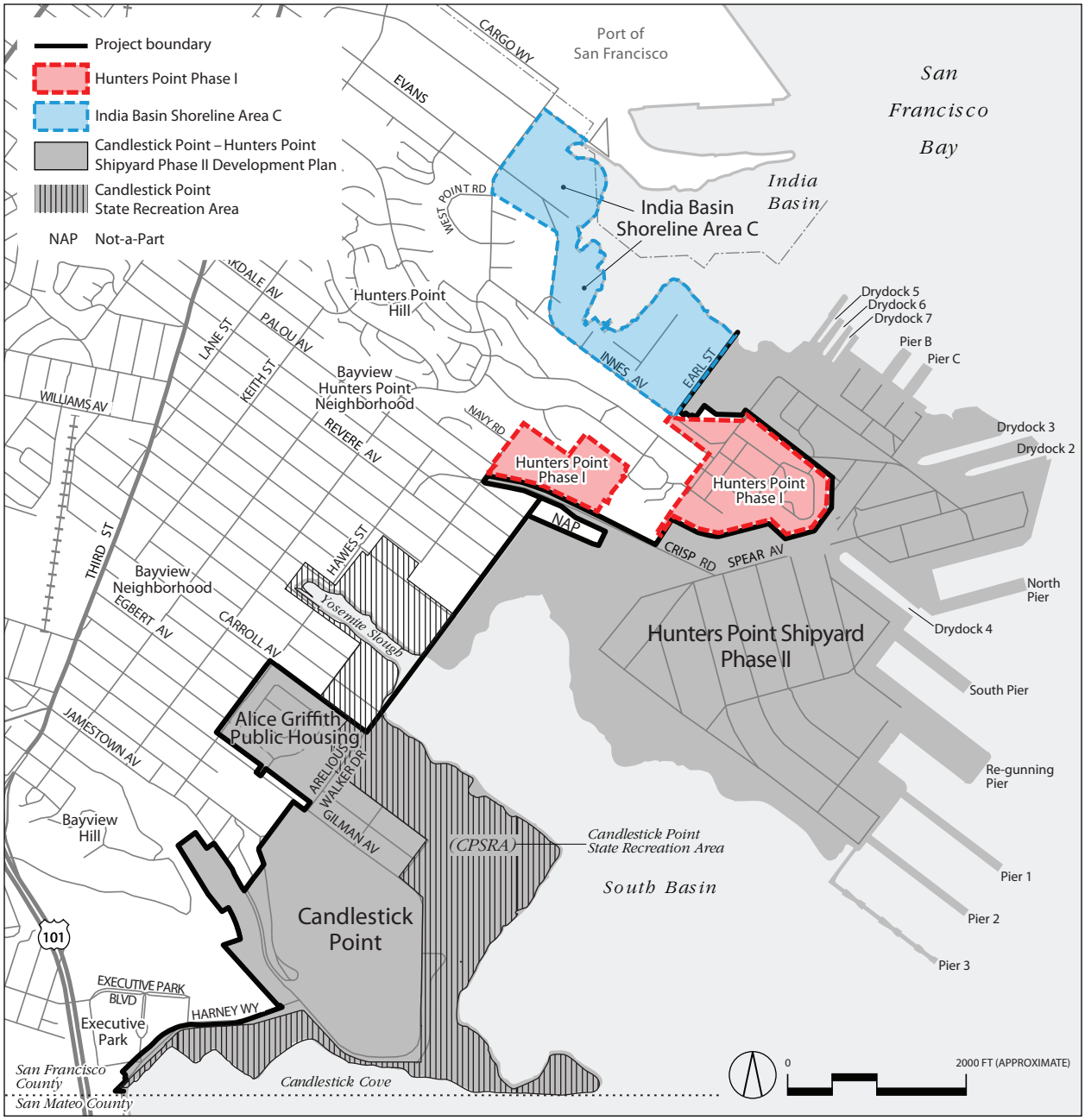
Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE II-1

PROJECT LOCATION



SOURCE: San Francisco Redevelopment Agency, Lennar Urban, 2009; PBS&J, 2010.

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FIGURE II-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT SITE AND CONTEXT

II.B.3 Hunters Point Shipyard Phase II

HPS Phase II is located to the southeast of the Bayview Hunters Point (BVHP) neighborhood. As shown in Figure II-2, the HPS Phase II portion of the Project site is generally bounded by San Francisco Bay to the north, east, and south. The south end of the western boundary extends from Yosemite Slough along Arelious Walker Drive to approximately Crisp Road[29] where the boundary is adjacent to the HPS Phase I site. The northernmost end of HPS Phase II is contiguous with Earl Street.

II.C PROJECT SETTING

II.C.1 Candlestick Point

The Candlestick Point portion of the Project site comprises approximately 281 acres. Current land uses in Candlestick Point include Candlestick Park stadium, owned by the City and County of San Francisco and leased by the San Francisco 49ers, and associated parking lots and access roadways. The stadium and parking lot areas immediately surrounding the stadium are under the jurisdiction of the San Francisco Recreation and Park Department. Additional parking is provided on adjacent CPSRA. Candlestick Point also includes the Alice Griffith public housing site (refer to Figure II-2).

The Project site includes several privately owned parcels near Gilman Avenue and Arelious Walker Drive, north of the stadium, and on Jamestown Avenue. The area is primarily vacant and used for stadium parking. A recreational vehicle park occupies a portion of the site on Gilman Avenue. Approximately 1 acre along Harney Way is also included in the Project.

Approximately 120 acres of the 154-acre CPSRA are also included within this portion of the Project site; the CPSRA forms the south and east shoreline boundary. On the southern portion of the CPSRA, existing improvements to the CPSRA include plantings, pathways, a beach, fishing piers, picnic areas, parking, and restrooms. The remaining CPSRA area includes gravel lots used as parking for the 49ers on game day, piles of rubble and debris, and unimproved areas. Some of the rubble and debris has been ground up and used for trails. Refer to Section III.P (Recreation) for a detailed description of the existing conditions at the CPSRA.

II.C.2 Hunters Point Shipyard Phase II

HPS Phase II comprises 421 acres (dry land) on Navy Parcels A, B, C, D, E, and G, as described in the Introduction.

HPS Phase II currently contains many structures associated with ship repair, piers, dry-docks, ancillary storage, administrative, and other former Navy uses, largely from the World War II era. Most structures are vacant. Several former Navy buildings are currently leased and occupied. Current tenants at HPS Phase II include approximately 300 artists located in studios on Parcels A and B, and a San Francisco Police Department (SFPD) facility on Parcel D-1 in Building 606. The artists on Parcel B are located in

[29] Background documents relevant to this Project variously use the term Crisp Road or Crisp Avenue; irrespective of the use of Road or Avenue, the text and/or graphics are referring to that section of road that travels from Revere Avenue to Spear Avenue.

Buildings 103, 104, 115, 116, 117, and 125, and the artists on Parcel A are located in Buildings 101 and 110. The artists' work includes painting, sculpting, ceramics, and photography. Twice a year the artist community hosts an "Open Studios" for the general public to both view and purchase artwork.[30]

II.D PROJECT OBJECTIVES

Project objectives are identified to both describe the underlying purpose of the Project and to guide the selection of potential Project alternatives. CEQA Guidelines Section 15126.6(a) requires that an EIR "describe a reasonable range of alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives but would avoid or substantially lessen any of the significant effects of the project." Typically, project objectives represent a combination of both the Lead Agency and the developer's intent and purpose in moving forward with the project.

In May 2007, the Board of Supervisors and the Mayor approved a resolution endorsing a Conceptual Framework for the integrated planning of both Hunters Point Shipyard and Candlestick Point. The Conceptual Framework was the result of a long planning process undertaken by the City and County of San Francisco, acting by and through the Mayor's Office of Economic and Workforce Development, the Redevelopment Agency of the City and County of San Francisco, and Lennar Urban.

The City's overarching goal for the Project is to revitalize the BVHP community by providing increased business and employment opportunities; housing options at a range of affordability levels; improved public recreation and open space amenities; an integrated transportation, transit, and infrastructure plan; and other economic and public benefits, all of which would collectively have no net negative impact on the City's General Fund.

Subsequently, and in response to the Conceptual Framework, the San Francisco voters approved Proposition G in June 2008, which is called the Bayview Jobs, Parks, and Housing Initiative ("the Initiative"). Proposition G repealed Proposition F, which had established a special use district for the Project site; instead, Proposition G proposed that new zoning be established along with a land use program (included as Appendix B [Proposition G] to this EIR). The Initiative states that the Project must be consistent with the following objectives, which are also identified in this EIR as the Project's objectives:

1. The integrated development should produce tangible community benefits for the Bayview and the City, and in so doing should:
   - Improve the CPSRA to enhance public access to the waterfront and enjoyment of the Bay.
   - Create new public recreational and public open spaces in the CP-HPS Development Plan.
   - Preserve the shoreline of the CP-HPS Development Plan site primarily for public park and public open space uses, including an extension of the Bay Trail along the waterfront.
   - Create a range of job and economic development opportunities for local, economically disadvantaged individuals and business enterprises, particularly for residents and businesses located in the Bayview.
   - Provide neighborhood-serving retail.
   - Subsidize the creation of permanent space in the Shipyard for the existing artists.

[30] The Point, America's Largest Artist Colony Website. http://www.thepointart.com (accessed July 18, 2009).

- Transform the contaminated portions of the Shipyard Property into economically productive uses or public open space, as appropriate.
- Implement the CP-HPS Development Plan with public benefits, whether or not the 49ers decide to remain in San Francisco, including developing alternate uses for the stadium site on the Shipyard Property that are consistent with the overall CP-HPS Development Plan objectives.

2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger BVHP neighborhood and should maintain the character of the Bayview for its existing residents, and in so doing should:
   - Foster the creation of strong commercial, institutional, cultural and urban design ties between the development on Candlestick Point and the Hunters Point Shipyard and the Bayview in particular and the City in general.
   - Provide automobile, public transportation, and pedestrian connections between the Shipyard, Candlestick Point, and the larger BVHP neighborhood.
   - Create substantial affordable housing, jobs, and commercial opportunities for existing Bayview residents and businesses.
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourages the rebuilding of Alice Griffith Housing, and in so doing should:
   - Provide new affordable housing that is targeted to the lower income levels of the Bayview population, including new units that are suitable for families, seniors, and young adults.
   - Include housing at levels dense enough to create a distinctive urban form and at levels sufficient to make the CP-HPS Development Plan financially viable; attract and sustain neighborhood retail services and cultural amenities; create an appealing walkable urban environment served by transit; help pay for transportation and other infrastructure improvements; and achieve economic and public benefits for the Bayview in particular and the City generally.
   - Upon consultation with Alice Griffith Housing residents and the receipt of all required governmental approvals, rebuild Alice Griffith Housing to provide one-for-one replacement units targeted to the same income levels as those of the existing residents and ensure that eligible Alice Griffith Housing residents have the opportunity to move to the new, upgraded units directly from their existing Alice Griffith Housing units without having to relocate to any other area.
   - Include a mix of stacked flats, attached townhomes and—in appropriately selected locations—low-rise, mid-rise, and high-rise towers, to help assure the economic feasibility of the development and provide a varied urban form.
4. The integrated development should incorporate environmental sustainability concepts and practices, and in so doing should:
   - Apply sustainability principles in the design and development of public open spaces, recreation facilities, and infrastructure including wastewater, storm water, utility, and transportation systems.
   - Incorporate green building construction practices.
   - Include energy efficiency and the use of renewable energy.
   - Encourage green development projects, such as green office, research and development, or industrial projects, including a green technology, biotechnology, or digital media campus.

5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure, and in so doing should:
   - Provide the parking necessary to operate the stadium.
   - Provide the necessary transportation infrastructure, including automobile, public transit and pedestrian connections between Candlestick Point, Hunters Point Shipyard, and the larger BVHP neighborhood, to facilitate the efficient handling of game day traffic.
6. The integrated development should be fiscally prudent, with or without a new stadium, and in so doing should:
   - Minimize any adverse impact on the General Fund relating to the development of the Project Site by relying to the extent feasible on the development to be self-sufficient.
   - Encourage substantial private capital investment.

II.E PROJECT CHARACTERISTICS

This section describes the Project's development characteristics. In summary, the Project proposes development of 10,500 residential units with an associated population of 24,465 residents; 885,000 gsf of retail; 150,000 gsf of office; 2.5 million gsf of Research & Development (R&D) uses; a 220-room, 150,000-gsf hotel; 255,000 gsf of artist studio space and an arts center; 100,000 gsf of community services; 240 acres of new parks, sports fields, and waterfront recreation areas, as well as 97 acres of new and improved State parkland; a 69,000-seat 49ers stadium; and a 10,000-seat performance arena. The permanent employee population associated with the Project would be 10,730.

In addition, a 300-slip marina would be provided. Shoreline improvements would also be provided to stabilize the shoreline. The Project would include structured and on-street parking and various infrastructure improvements to support the development.

Table II-2 (Existing and Proposed Uses) identifies the existing and proposed land uses on the Project site, while Table II-3 (Proposed Land Use) provides detailed information about the specific land uses at each of the Candlestick Park and Hunters Point Shipyard Phase II sites.

II.E.1 Land Use Plan

The Project would consist of nine districts: five in Candlestick Point and four in HPS Phase II (refer to Figure II-3 [Proposed Districts]).[31] A variety of land uses are proposed. Table II-3 presents the overall land use distribution and Figure II-4 (Proposed Land Use Plan) illustrates the land use plan. Figure II-5 (Proposed Maximum Building Heights) identifies the maximum height that could be constructed. The maximum heights are intentionally high to provide a conservative (worst-case) scenario for the EIR analysis. Actual building heights would be controlled through Redevelopment Plan documents to minimize shading impacts, among other considerations.

[31] The boundaries of "districts" in the HPS Phase II area do not correspond with the boundaries of the five areas designated Parcels A through E by the Navy.

Table II-2 Existing and Proposed Uses

	Existing Uses	*Existing Uses to Be Retained*	*Proposed Uses*	*Total*
Residential (units)				
Public Housing	256	256[a]	0	256
Market-rate	0	0	7,155	7,155
Affordable and below-market	0	0	3,089	3,089
Subtotal Residential	*256*	*256*	*10,244*	*10,500*
Nonresidential				
Retail (gsf)	0	0	885,000	885,000
Office (gsf)	13,500[b]	0	150,000	150,000
Research & Development (gsf)	0	0	2,500,000	2,500,000
Hotel (gsf)	0	0	150,000	150,000
Artists' Studios/Art Center[c]	225,000c	225,000	30,000	255,000
Community Services (gsf)	0	0	100,000	100,000
Subtotal Nonresidential	*238,500*	*225,000*	*3,815,000*	*4,040,000*
Performance Venue/Arena (gsf)	0	0	75,000	75,000
Football Stadium (seats)	70,207	0	69,000	Approximately the same
Parks and Open Space (acres)				
State Parkland (acres)	120.2	91.0	5.7	96.7
Dual-Use Parking/Parks[d] (acres)	0	0	91.6	91.6
Parks and Open Space (acres)	0	0	148.1	148.1
Subtotal Parks and Open Space	*120.2*	*91.0*	*245.4*	*336.4*

SOURCE: Lennar, 2009

a. The Project would replace these units.

b. The SFPD leases space on Parcel D-1 in Building 606 as a crime laboratory. Available at: http://www.sfgov.org/site/police_index.asp?id=21356. Building 606 would be demolished.

c. Approximately 300 artists have studios on HPS Phase II. The Project would retain these uses, with approximately 225,000 gsf of new and renovated artists' studios and 30,000 gsf art center uses.

d. Approximately 59.7 acres of the 91.6 acres would be dual-use sports field complex and multi-use lawn as well as stadium parking for 12 game days and 20 other stadium events.

Table II-3 Proposed Land Use

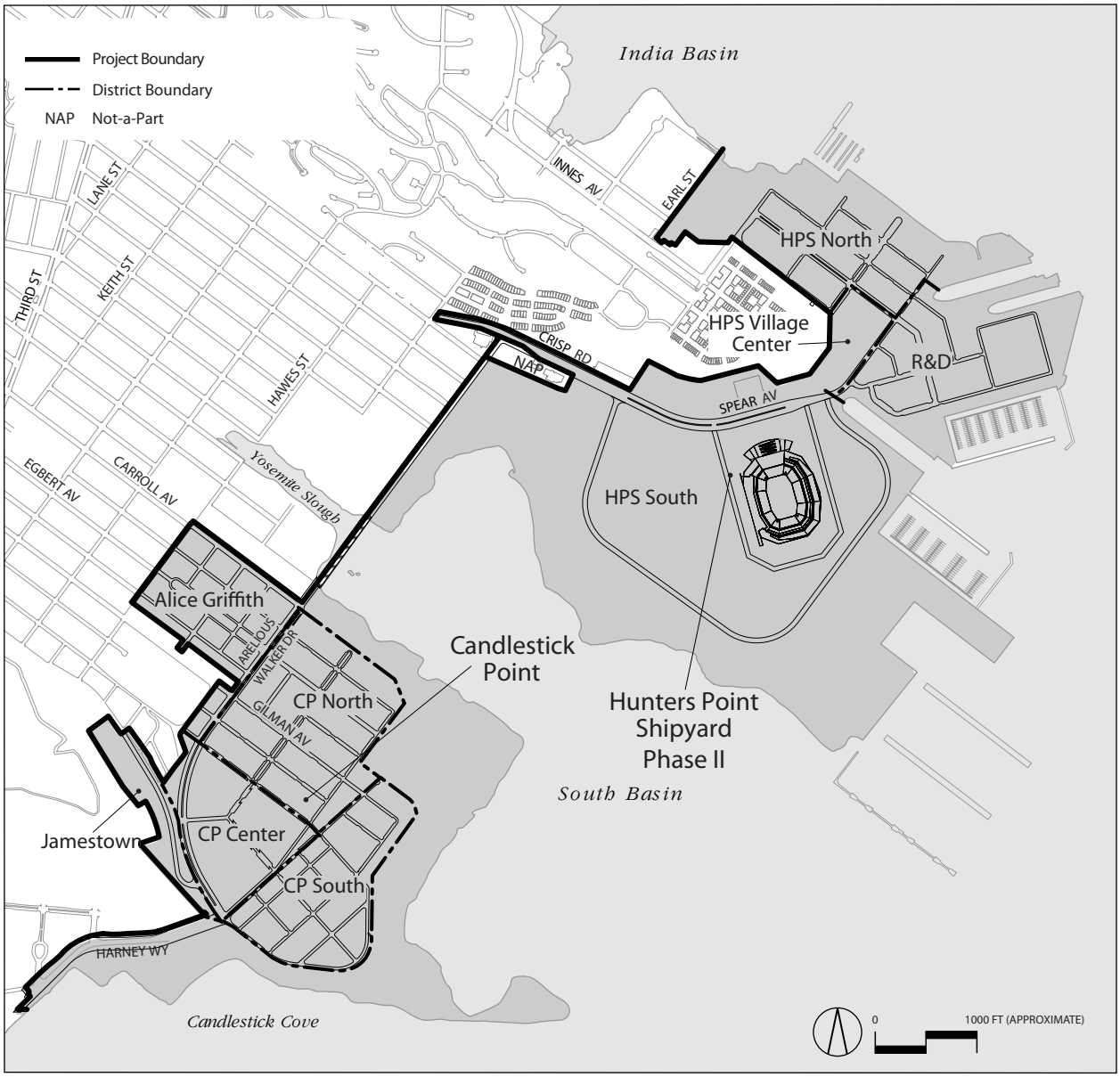
Land Use		*Candlestick Point*	*Hunters Point Shipyard Phase II*	*Total*
Residential				
Residential Density Range I (15 to 75 units per acre)		750	680	1,430
Residential Density Range II (50 to 125 units per acre)		3,215	1,415	4,630
Residential Density Range III (100 to 175 units per acre)		2,445	265	2,710
Residential Density Range IV (175 to 285 units per acre)		1,440	290	1,730
	Total (units)	*7,850*	*2,650*	*10,500*
Retail				
Regional Retail (gsf)		635,000	N/A	635,000
Neighborhood Retail (gsf)		125,000	125,000	250,000
	Total (gsf)	*760,000*	*125,000*	*885,000*
Office (gsf)		150,000	N/A	150,000
Research & Development[a]		N/A	2,500,000	2,500,000
Hotel (gsf)		150,000	N/A	150,000
Rooms		220	N/A	220
Artists' Studios/Art Center (gsf)		N/A	255,000	255,000
Community Services (gsf)[b]		50,000	50,000	100,000[a]
Parks & Open Space				
New Parks (acres)		8.1	140.0	148.1
New Dual-Use Sports Fields/Multi-Use Lawn and Stadium Parking and Waterfront Recreation (acres)		N/A	91.6	91.6
Existing State Parkland Improved (acres)		91.0	N/A	91.0
New State Parkland (acres)		5.7	0	5.7
	Total (acres)	*104.8*	*231.6*	*336.4*
Football Stadium (seats)		N/A	69,000	69,000
Gsf		N/A	1,860,000	1,860,000
Marina (slips)		N/A	300	300
Performance Venue/Arena (gsf)		75,000	N/A	75,000
Seats		10,000	N/A	10,000
Parking (spaces)				
Residential (structured)		7,850	2,650	10,500
Commercial (structured)		2,346	4,028	6,374
General and Commercial (on-street)		1,360	683	2.043
Dedicated Stadium[c]		N/A	12,665	12,665

SOURCE: Lennar Urban, 2009.

a. Research & Development includes office, laboratory, and light industrial uses.

b. A site for a fire station could be provided on R&D land not explicitly dedicated to community facilities. Community facilities parcels are intended to provide the existing Bayview Hunters Point community and the future Project community with dedicated land for uses designed to provide, preserve, and leverage such critical local resources as social services, education, the arts and other community services, including public safety facilities such as fire and police stations and facilities for the benefit of senior citizens. Community facilities may be provided that cumulatively exceed 100,000 square feet. If so, the Project contemplates an equal reduction in retail and/or R&D and/or office use. Total uses would not exceed those amounts identified in this table.

c. On Game Day, an additional 3,750 parking spaces on HPS and 1,000 parking spaces on CP will be dedicated to the 49ers.



SOURCE: San Francisco Redevelopment Agency, Lennar Urban, 2009.

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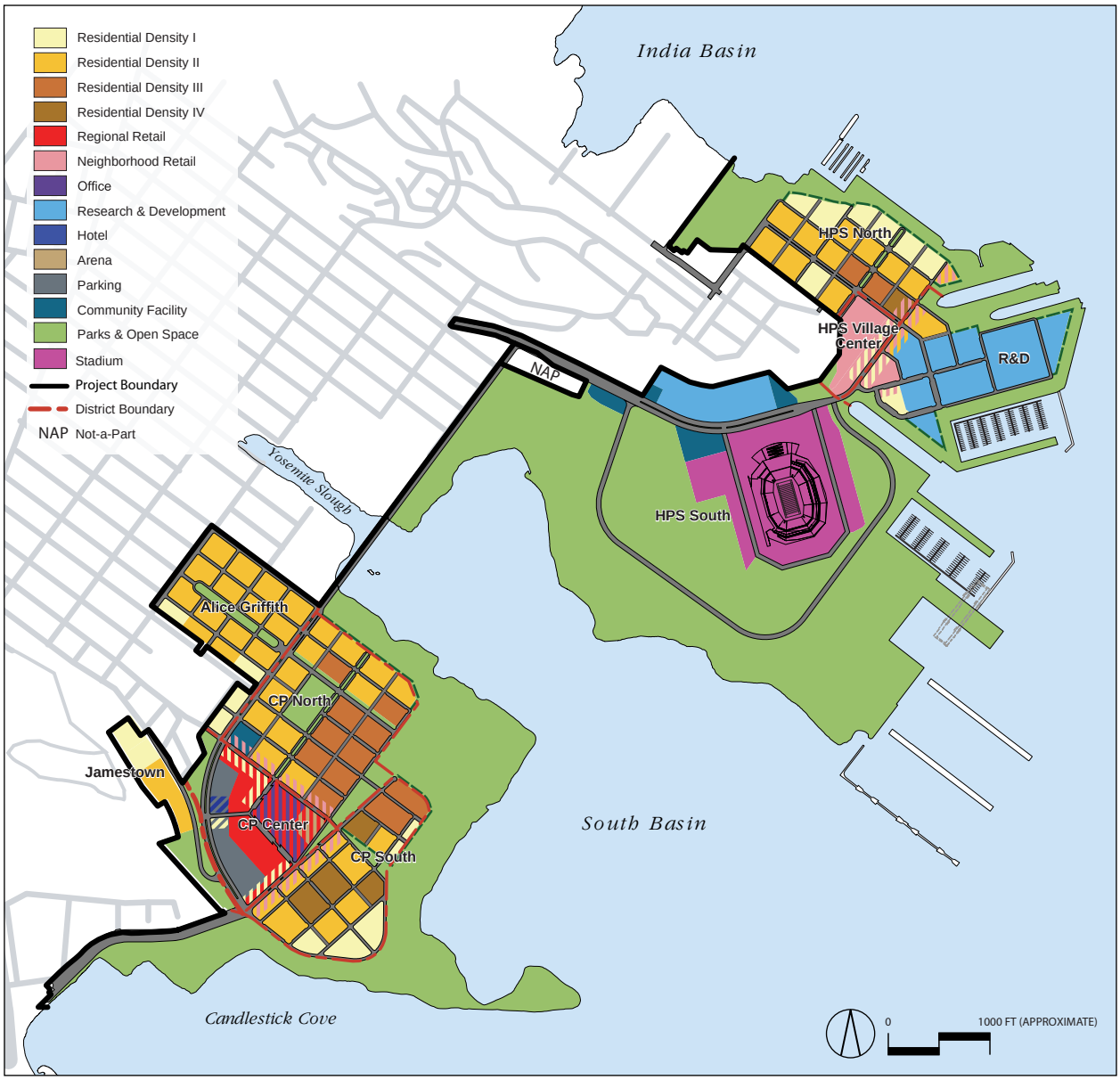
Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED DISTRICTS

FIGURE II-3



SOURCE: Lennar Urban, 2009.

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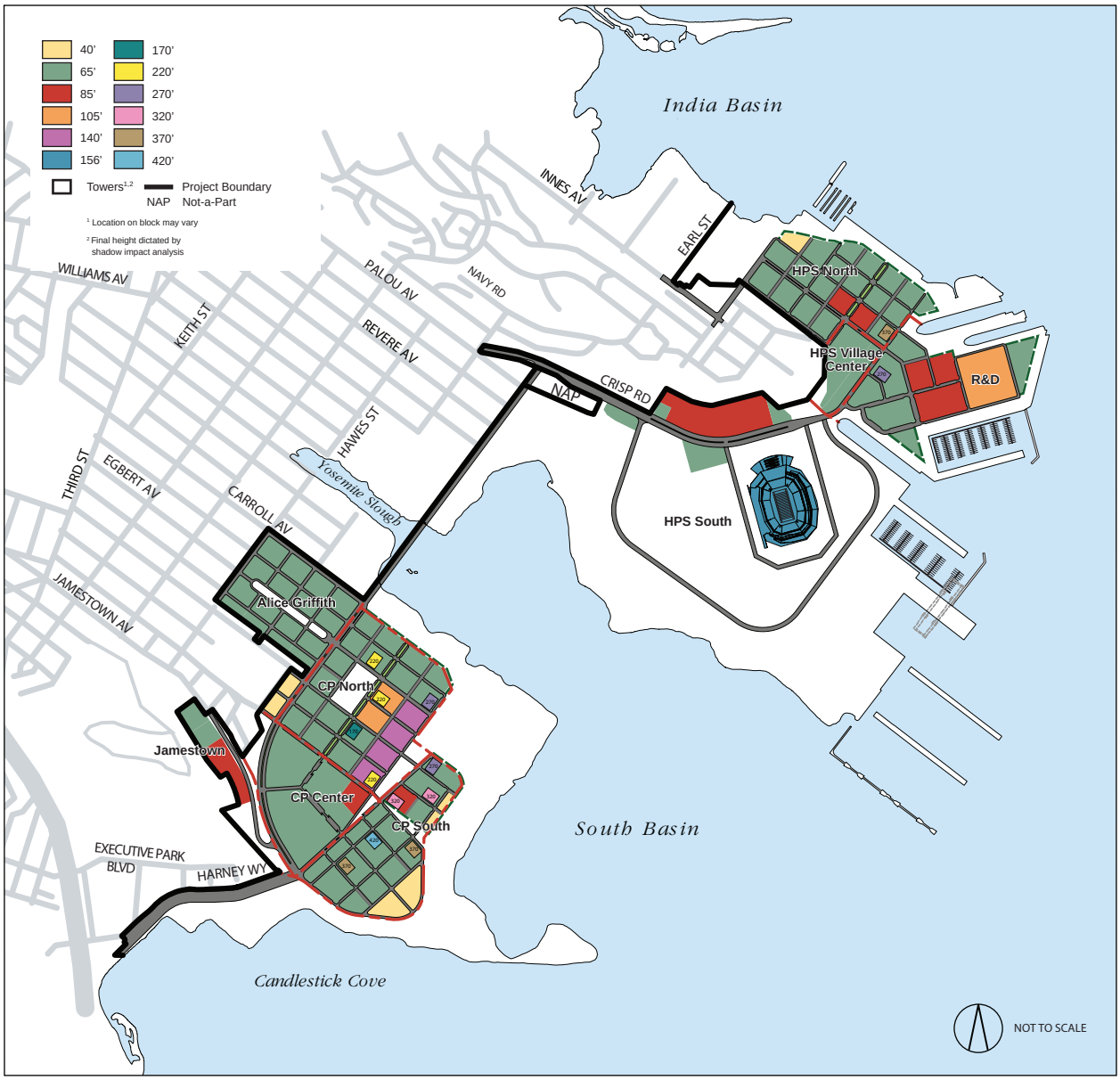
FIGURE II-4 Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED LAND USE PLAN



SOURCE: Lennar Urban, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE II-5

PROPOSED MAXIMUM BUILDING HEIGHTS

Section II.E.1 (Land Use Plan) describes the land uses and urban design components of the Project. Section II.E.2 (Parks and Open Space) describes the proposed parks and recreation areas; including the CPSRA; and proposed habitat restoration. Section II.E.3 (Transportation Improvements) describes the transportation network, proposed residential and commercial parking, and bicycle and pedestrian circulation. Section II.E.4 (Infrastructure Plan) describes utility infrastructure improvements. Section II.E.5 (Community Benefits) describes the affordable and below-market housing program, education, and employment and training benefits to the Bayview community. Section II.E.6 (Green Building Concepts) describes the various sustainability and/or green building concepts that would be incorporated into the Project design.

The following provides a detailed discussion of each of the land use types described by Table II-3.

- **Residential:** The Project would consist of 10,500 for-sale and rental residential units, including approximately 7,155 market-rate units and approximately 3,345 affordable and below-market units. The homes would range in size from studios to four bedrooms. Housing types include two- and three-story townhomes over parking, four- to seven-story low-rise flats over podium parking, eight- to 21-story mid-rise flats, and 22- to 42-story high-rise towers. Depending on their location, the lower floors of all residential building types (other than townhomes) could include commercial uses, as well as community services.
  - Residential Density Range I (15 to 75 units per net acre[32]): Housing types would typically include townhomes, low-rise flats and lofts
  - Residential Density Range II (50 to 125 units per net acre): Housing types would typically include low-rise flats, and lofts
  - Residential Density Range III (100 to 175 units per net acre): Housing types would typically include low and mid-rise flats, or low-rise flats and high-rise buildings
  - Residential Density Range IV (175 to 285 units per net acre): Housing types would typically include low-rise and mid-rise flats and high-rise buildings
- **Regional Retail:** A regional retail center of up to 635,000 gross square feet (gsf) is proposed on Candlestick Point. Retailers could include a variety of general merchandise, apparel, furniture and home furnishings, food service and restaurants, and entertainment related businesses to serve the regional market. Community services may also be allowed on sites designated for regional retail uses.
- **Neighborhood Retail:** Neighborhood retail sites are designated at both Candlestick Point and Hunters Point Shipyard, and in addition, small-scale neighborhood retail uses could be established throughout the Project site depending on demand. Up to 250,000 gsf of neighborhood retail could include convenience goods (e.g., food, drugs and groceries) and personal services (e.g., laundry, dry cleaning, barbering, and shoe repair) for daily needs of the immediate neighborhood. This could also include a fire station site and/or other community services.
- **Office:** Up to 150,000 gsf of office uses on Candlestick Point could include but not be limited to professional offices, real estate offices, financial services, and community services.
- **Research and Development:** Hunters Point Shipyard Phase II would be the site of up to 2,500,000 gsf of a possible wide range of office, laboratory, and light industrial uses including, but not limited to, emerging industries and technologies such as green technology and biotechnology. This could also include a fire station site.

[32] The density ranges are measured against net acres on a block-by-block basis.

- **Hotel:** A 220-room hotel is proposed at Candlestick Point.
- **Artists' Studios/Arts Center:** Up to 225,000 gsf of artists' studios and accessory neighborhood retail is proposed on Hunters Point Shipyard and 30,000 gsf would be dedicated for the construction of an arts center.
- **Community Services:** Community serving uses are proposed at sites on both Candlestick Point (50,000 gsf) and HPS Phase II (50,000 gsf). Proposed uses include a fire station on 0.5 acre at HPS Phase II and 6,000 square feet for police facilities. In addition, uses may include, but are not necessarily limited to, healthcare, day-care, senior centers, library, recreation centers, and community centers. Facilities may be provided that cumulatively exceed 100,000 square feet. If so, the Project contemplates an equal reduction in retail and/or research and development and/or office use.
- **Parks and Open Space:** The Project would include an estimated 239.7 acres of new public parks, sports fields, and new open space at the Project site. The 59.7 acres of the Dual-Use Sports Field Complex and Multi-Use Lawn would also be used as stadium parking for 12 game days and 20 other stadium events per year. The CPSRA would be improved on 96.7 acres.
- **Stadium:** A 69,000-seat stadium is proposed for the San Francisco 49ers and up to 20 additional events per year including but not limited to college bowl games, motor-cross, concerts, and antique shows.
- **Marina:** A 300-slip marina is proposed at Hunters Point Shipyard. A marina could include utilities at each slip and a sewage pump-out. Landside amenities could include a classroom facility to teach sailing, restrooms, and showers.
- **Performance Venue/Arena:** A 10,000-seat venue for theatre productions, concerts, speaking engagements, educational events, or sporting events is proposed at Candlestick Point. Approximately 150 events at about 50 percent capacity could occur each year.
- **Parking:** Parking would be provided as structured parking for residential uses, as structured and on-street parking for commercial uses, for dedicated stadium use, and as general parking.

Candlestick Point

Development on Candlestick Point would include demolition and replacement of 256 public housing units, demolition of the 70,207-seat 49ers stadium, and a net reduction of 23.5 acres of CPSRA land.

Candlestick Point would consist of five districts encompassing approximately 110 net acres. Table II-4 (Candlestick Point Proposed Land Use Summary) presents the land use distribution for Candlestick Point and Figure II-4 illustrates the proposed Candlestick Point land use plan. Site preparation at Candlestick Point would involve demolition activities including removal of Candlestick Park stadium. Section II.F.2 (Site Preparation) provides additional information regarding site preparation activities at Candlestick Point.

Table II-4 Candlestick Point Proposed Land Use Summary

District	*Net Acres*[a]	*Number of Residential Units*[b]	*Density*	*Regional Retail (gsf)*	*Neighborhood Retail (gsf)*	*Hotel (gsf)*	*Office (gsf)*	*Arena (gsf)*	*Community Services (gsf)*	*Total Commercial (gsf)*	*Parks (acres)*
Alice Griffith	19.71	1,210	I, II	0	0	0	0	0	0	0	1.4
Candlestick Point North	31.15	3,070	II, III	0	70,000	0	0	0	50,000	120,000	4.2
Jamestown	6.80	325	I, II	0	0	0	0	0	0	0	0
Candlestick Point Center	21.07	275	I	635,000	0	150,000	150,000	75,000	0	1,010,000	0
Candlestick Point South	26.35	2,970	I, II, III, IV	0	55,000	0	0	0	0	55,000	2.5
Total	***105.08***	***7,850***	***NA***	***635,000***	***125,000***	***150,000***	***150,000***	***75,000***	***50,000***[c]	***1,185,000***	***8.1***

SOURCE: Lennar Urban, 2009.

a. Net Acreage excludes the street network within the district. Also note that CPSRA area includes 120.2 acres.

b. 750 Residential Density Range I (15 to 75 units per net acre)
3,215 Residential Density Range II (50 to 125 units per net acre)
2,445 Residential Density Range III (100 to 175 units per net acre)
1,440 Residential Density Range IV (175 to 285 units per net acre)
7,850 Total Units

c. This includes approximately 1.0 acre of community services area.

Alice Griffith

Development in the Alice Griffith district would include up to 1,210 new homes on approximately 20 net acres and include redevelopment of the San Francisco Housing Authority (SFHA) Alice Griffith public housing site along with development of adjacent non-SFHA property. Housing would include one-for-one replacement of 256 public housing units currently on the site, and 954 market-rate and below-market for-sale and rental units. Residential uses are proposed at Densities I and II with maximum building heights up to 65 feet. The homes would include townhomes, stacked townhomes, and four- to five-story stacked flats. A new 1.4-acre Alice Griffith Neighborhood Park would extend for several blocks near the center of the neighborhood parallel with Egbert Avenue (refer to Figure II-4). Redevelopment of the Alice Griffith public housing site would proceed in phases and would not displace existing residents. The initial phases would develop current vacant portions of the Alice Griffith district, and existing residents would then occupy public housing replacement units before demolition of existing structures in subsequent phases.

Existing 256 public housing units would be demolished on the existing SFHA site and 844 new homes would be constructed in their place along with neighborhood serving retail and services, open space and new streets. The 844 new homes would include a mix of market-rate, affordable and below-market rental and homeownership and public housing replacement units.

Candlestick Point North

Candlestick Point North district would include 3,070 residential units, community services, neighborhood retail uses, and neighborhood parks on approximately 32 net acres (refer to Figure II-4).[33] Residential uses are proposed at Densities II, and III, and include townhomes, low- and mid-rise flats, and five towers from 170 feet to 270 feet. The ground floors of the residential units along the southern edge of the district have been designated for up to 70,000 gsf of neighborhood retail uses. A site for 50,000 gsf of Community Facilities is also included in this district. As described below, Candlestick Point North would include a 3.1-acre Candlestick Point Neighborhood Park in the center of the district and 2.5-acre Bayview Gardens/Wedge Park along its southeastern edge.

Jamestown

The Jamestown district would include 325 residential units on the west side of Jamestown Avenue on approximately 7 net acres (refer to Figure II-4). The Jamestown district would include units at residential Density I on the north end of the district, with a maximum height up to 65 feet. The southern portion of the district would have residential uses at Density Range II with a maximum height up to 85 feet.

Candlestick Point Center

Candlestick Point Center district would include regional retail, office, hotel, entertainment, and residential uses at the west end of Candlestick Point on approximately 21 net acres, on three large blocks (refer to Figure II-4).

[33] The number of residential units in each district may be adjusted depending on market demand; however, the sum totals of housing units for Candlestick Point will not exceed 7,850 units.

The proposed 635,000 gsf of regional retail is anticipated to include entertainment uses such as a movie theatre and clubs with live music, restaurants, a hotel, and large format retail lined with smaller stores fronting onto the neighborhood streets. The Center would also include a 75,000 gsf, 10,000-seat performance venue/arena that would be used for performing arts, dance, sporting events, and music. Most events would take place on weekday evenings and weekends. The Center would have about 150,000 gsf of office uses on the floors above the retail and entertainment uses (refer to Figure II-4). Candlestick Point Center would include 275 residential units at Density Range I along the perimeter of the blocks, above base floors containing commercial uses and parking areas. The 150,000 gsf, 220-room hotel would be at the western edge of the district.

Candlestick Point Center would include buildings up to 65 and 85 feet in height (refer to Figure II-5). Parking structures would be interior to blocks and consist of up to four floors including up to one sub-grade level.

Candlestick Point South

Candlestick Point South district would include residential and retail development on approximately 26 net acres (refer to Figure II-4). The district would provide approximately 2,970 residential units and 55,000 gsf of neighborhood retail space. Neighborhood retail uses would be within the lower floors of buildings facing Candlestick Point Center district.

Residential uses would include Density Ranges I though IV. Two residential towers on the south half of the district would have maximum heights up to 370 feet. An additional residential tower on the south half of the district would be up to 420 feet tall. The north half of the district would have three residential towers, one with maximum height up to 270 feet and two with maximum heights up to 320 feet (refer to Figure II-5). Residential uses at Density Range I would be along the south and southeast portions of the district adjacent to parks and open space areas. As described below, Candlestick Point South would include a 1.1-acre Mini-Wedge Park bisecting the district from east to west (refer to Figure II-4).

■ Hunters Point Shipyard Phase II

Development on HPS Phase II would include demolition and replacement of studios for approximately 300 artists. In addition, all of the vacant, and some leased, Navy buildings would be demolished, with the exception of historic Drydocks Nos. 2 and 3 and Buildings 140, 204, 205, 207, and 208 as discussed in Section III.J (Cultural and Paleontological Resources).

HPS Phase II would consist of four districts on approximately 76 net acres: Hunters Point Shipyard North, Hunters Point Shipyard Village Center, Research and Development, and Hunters Point Shipyard South. Table II-5 (Hunters Point Shipyard Phase II Proposed Land Use Summary) presents the land use summary for HPS Phase II and Figure II-4 illustrates the proposed HPS Phase II land use plan. (Table II-5 does not include the stadium use.) Development of Hunters Point Shipyard South includes the new stadium and related open space and parking facilities. Site preparation of HPS Phase II would involve demolition and abatement activities including removal of existing structures and infrastructure. Section II.F.2 (Site Preparation) provides additional information regarding site preparation activities at HPS Phase II.

Table II-5 Hunters Point Shipyard Phase II Proposed Land Use Summary

District	*Net Acres*[a]	*Dwelling Units*[b]	*Density*	*Neighborhood Retail (gsf)*	*Artist Space (gsf)*	*R & D (gsf)*	*Community Services (gsf)*[c]	*Total Commercial (gsf)*	*Football Stadium (Seats)*	*City Parks (acres)*
Hunters Point Shipyard North	27.30	2,085	I, II, III, IV	25,000	0	0	0	25,000	0	19.9
Hunters Point Shipyard Village Center	7.55	125	I	25,000	255,000	0	0	280,000	0	15.6
Research & Development	26.22	440	I, II	75,000	0	2,000,000	0	2,075,000	0	25.3
Hunters Point Shipyard South	14.86 (32.26 acres with the stadium)	0	N/A	0	0	500,000	50,000	550,000	69,000	170.8
Total	***75.93***	***2,650***	***N/A***	***125,000***	***255,000***	***2,500,000***	***50,000***	***2,930,000***	***69,000***	***231.6***

SOURCE: Lennar Urban, 2009

a. Net Acreage excludes the street network.

b. 680 Residential Density Range I (15 to 75 units per net acre)
1,415 Residential Density Range II (50 to 125 units per net acre)
265 Residential Density Range III (100 to 175 units per net acre)
290 Residential Density Range IV (175 to 285 units per net acre)
2,650 Total Units

c. These uses would be constructed on 5.3 acres in HPS Phase II.

Hunters Point Shipyard North

The HPS North district would include residential and neighborhood retail uses on approximately 27 net acres.[34] A new street grid would create approximately 10 blocks (refer to Figure II-4). The district would include 2,085 residential units. The majority of residential uses would be at Density Ranges I, II, III, and IV with maximum heights ranging from 40 to 85 feet. One residential tower at Density Range IV with a maximum height up to 370 feet would be at the southeast corner of the district, adjacent to HPS Village Center. As described below, the district would include the 12.8-acre Northside Park, and 25,000 gsf of neighborhood retail uses.

Hunters Point Shipyard Village Center

The HPS Village Center district would include redevelopment of the existing artist studios, and new residential and neighborhood retail uses with development on approximately 7.6 net acres (refer to Figure II-4). The existing artist studio space throughout HPS Phase II is approximately 225,000 gsf and is located in Shipyard Buildings 101, 103, 104, 110, 115, 116, 117, and 125. With the exception of Building 101, those existing buildings would be demolished. New studios in a renovated Building 101 and other new buildings, including an Art Center, would provide space dedicated for artists and arts-related uses of 255,000 gsf. New buildings would have a height limit of up to 65 feet. The Village Center would provide about 25,000 gsf of neighborhood retail uses and 125 residential units at Density Range I along the southeast edge of the district. The residential space would be located above the retail uses in a building with a height limit up to 65 feet (refer to Figure II-5). As described below, the Hunters Point Village Center district would also include the 15.6-acre Heritage Park.

Research and Development

The research and development (R&D) district would include 2,000,000 gsf of research and development, office, and light industrial space, which would be marketed to attract emerging technologies—with a particular focus on green technology businesses. A grid street pattern would create approximately 10 blocks with development covering approximately 26 net acres (refer to Figure II-4).

The R&D district would also include approximately 440 residential units at Density Ranges I and II near the west end of the district. The R&D district would include about 75,000 gsf of neighborhood retail uses east of the retail uses of HPS Village Center district. Maximum heights of the retail with residential above buildings would be 65 feet and at Density Range II, with the exception of one high-rise tower in the north west at 270 feet. Structures in the center of the district would range from 85 to 105 feet tall. Parking structures would be internal to a block. As described below, the 29.5-acre Waterfront Promenade would begin at HPS North district and continue along the edge of the R&D district and Village Center district and terminate at HPS South district.

[34] The number of residential units in each district may be adjusted depending on market demand; however, the sum totals of housing units for Hunters Point Shipyard will not exceed 2,650 units.

Hunters Point Shipyard South

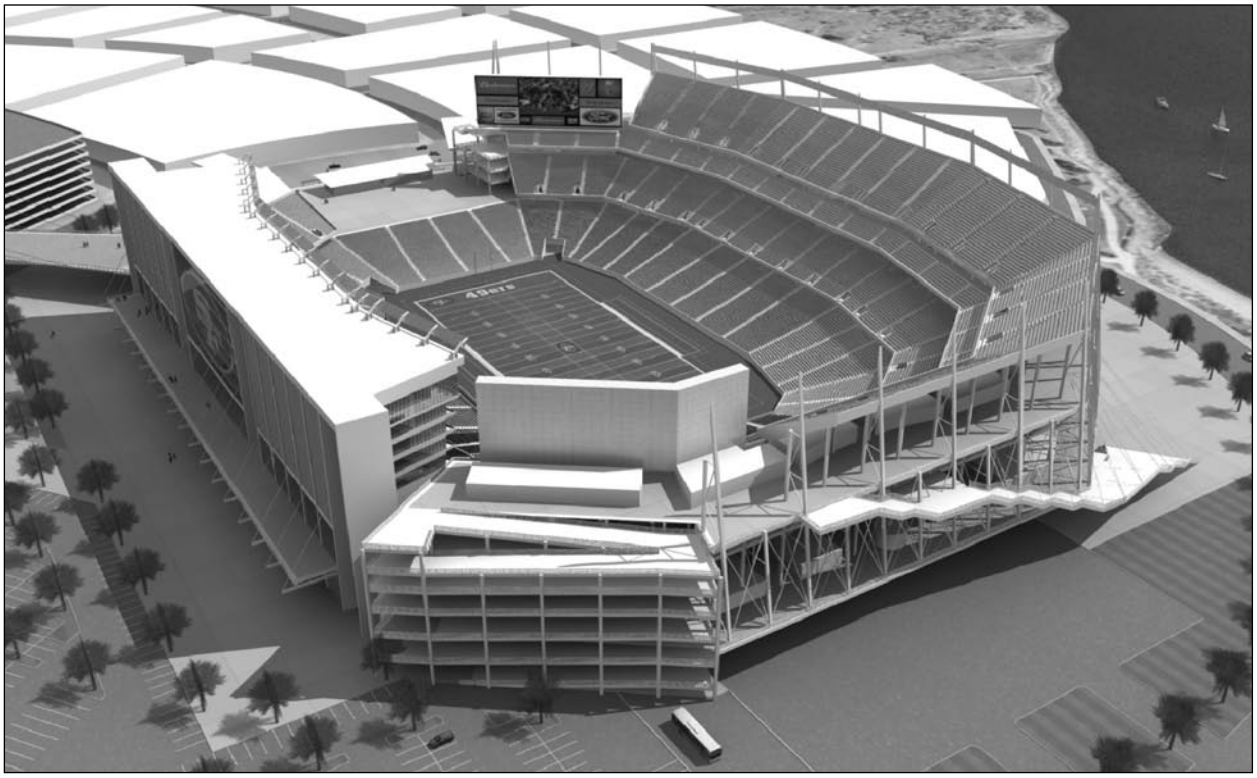
The HPS South district would include 500,000 gsf of R&D space, office, and light industrial uses on approximately 15 net acres. These uses could be located north of Crisp Road, northwest of the proposed new stadium. Maximum heights of the R&D structures would be 85 feet. In addition, this district would include 50,000 gsf of community service uses located on three sites along Crisp Road to the north and west of the stadium. HPS South district would be the site of a new 69,000-seat San Francisco 49ers stadium. The stadium would include about 1,860,000 gsf, with seating, ramps and stairs, team offices and administrative space, food service and retail areas, and access facilities for stadium visitors, players, and staff on 17.4 acres. The stadium would be five levels on the north, east, and south sides, and nine levels on the west (referred to as the Suite Tower). The top row of seating would be at an elevation of approximately 156 feet above the playing field; the top of the stadium light towers would be at an approximate elevation of 192 feet. The event level of the stadium would include the playing field, locker rooms, main commissary, grounds keeping facilities, operations space (including management, janitorial, and security), loading docks, and facilities for other support functions. Press facilities would be located on the top level on the west side of the stadium. The box-office, 49ers team store, stadium offices, and other stadium-related commercial space would be on the ground level of the west side. Figure II-6 (49ers Stadium Conceptual Design Plan) and Figure II-7 (49ers Stadium Conceptual Elevations) illustrate the proposed stadium.

National Football League teams typically play half of all pre-season and regular season games at home. In one season, the San Francisco 49ers could play up to two pre-season, eight regular season, and two post-season games at home.[35] The preseason begins in August and the regular season extends through December. In addition to pre-season and regular season games, there is also a possibility that the 49ers would host up to two post-season games each year. It would also be likely that San Francisco would be asked to host a Super Bowl game. The Super Bowl is considered an extraordinary event and would likely occur in San Francisco approximately once every five to 10 years. In addition to San Francisco 49ers football, other major events could occur at the stadium, including college football games, soccer games, concerts, festivals, antique and car shows, or other events. These additional events would be limited to 20 total occurrences per year.

The parking areas surrounding the 49ers Stadium would serve stadium-related events. The Dual-Use Sports Field Complex and Multi-Use Lawn adjacent to the proposed stadium and permanent parking areas would serve as recreation and athletic fields when not used as parking for stadium events. The surface of the fields would be seeded grass above top soil with synthetic fibers and other base materials to support vehicle parking. The permanent parking area and dual-use areas would provide approximately 12,665 parking spaces for games and events.[36] When not needed for games or events, the dual-use areas would be available to serve recreation and related events.

[35] Each NFL team typically plays four preseason games. The NFL has a 17-week regular season. Each season, all NFL teams have one bye week (week off) where the team does not play. Therefore, each team plays 16 regular season games during the 17-week period.

[36] An additional 3,750 parking spaces are available for evening and weekend stadium events on the R&D sites.



SOURCE: HNTB Architects, 2007.

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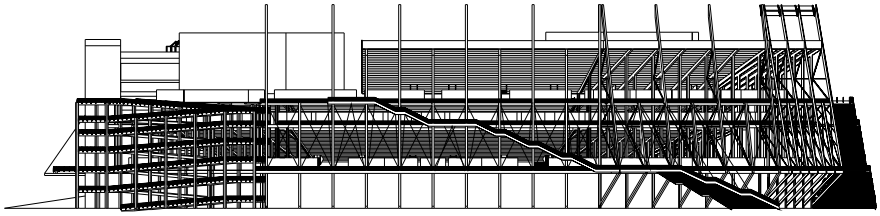
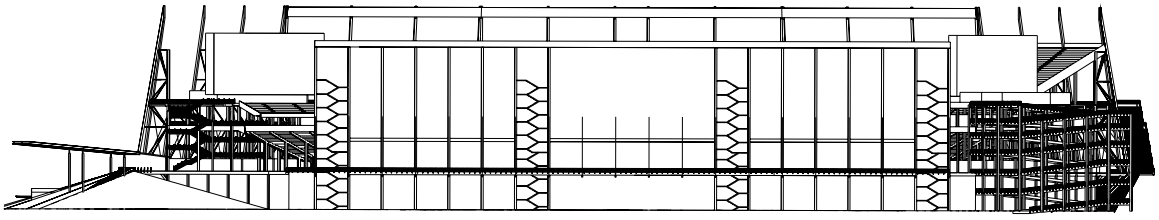
FIGURE II-6

Candlestick Point — Hunters Point Shipyard Phase II EIR

49ERS STADIUM CONCEPTUAL DESIGN PLAN



South Elevation



West Elevation—Suite Tower

SOURCE: HNTB Architects, 2007.

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FIGURE II-7

Candlestick Point — Hunters Point Shipyard Phase II EIR

49ERS STADIUM CONCEPTUAL ELEVATIONS

Hunters Point Shipyard Piers, Drydocks, and Waterside Uses

Piers and Drydocks

The Shipyard currently includes seven piers and six drydocks along the shoreline (refer to Figure II-2). As part of the base closure and conveyance process described in Chapter I (Introduction), the Navy will remove Piers B and C and timber portions (concrete walls would remain) of Drydocks 5, 6, and 7 prior to conveyance of HPS Phase II to the City and County of San Francisco. Drydocks 2 and 3 and four supporting buildings (Buildings 140, 204, 205, and 207) were previously identified as historic resources eligible for listing in the National Register of Historic Places.[37] Heritage Park is proposed at Drydocks 2 and 3 and would display interpretive elements related to the history of HPS. Drydocks 4, 5, 6 and 7 and the Re-Gunning Pier and crane would remain. Piers 1, 2, and 3 consist of long, narrow concrete piers in the southeastern portion of HPS Phase II. These pier structures would remain in place, but portions of the pier would be removed to prevent public access for safety reasons. The Re-Gunning Pier would be reconfigured for wildlife habitat uses. Some pier areas would require cleaning and repaving. The North and South Piers would be the sites of the proposed marina, discussed below.

Marina

The Project would include an approximately 300-slip marina along the east shoreline of HPS Phase II, north of the Re-Gunning Pier (refer to Figure II-4). The marina slips are proposed along the North and South Piers.

The marina would include up to 300 slips accessed by a series of gangways and floating docks. Guide piles would horizontally restrain the floating docks. Each slip would include potable water, electrical, cable television, and telephone connections. The marina would provide sewage pump-out stations at each slip or at a central pull-up station. Landside improvements adjacent to the marina could include parking, restroom facilities, a classroom to teach sailing, and a harbormaster's office.

The marina would require installation of two breakwaters approximately 1,300 to 1,650 feet in total length, split up into two to three sections (ranging between 300 and 650 feet in length).[38]The breakwaters would create two 10.7- to 11.3-acre basins. The footprint of the breakwaters will cover approximately 0.05 to
- 0.1 acre of bay bottom. The existing North and South piers would remain and provide protection to the marina basins by acting as breakwaters. Breakwaters would be constructed using concrete sheet pile supported by batter piles and installed using water-based equipment.

The current water depths of up to 16 feet of the proposed marina basin would be adequate for recreation craft, and the basin would not require initial dredging. However, maintenance dredging would be required in the future to maintain adequate clearance.

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[37] City and County of San Francisco and San Francisco Redevelopment Agency, Final Environmental Impact Report for the Reuse of Hunters Point Shipyard, February 8, 2000. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[38] Devick, Christopher, Moffat-Nichol email to Therese Brekke of Lennar Urban and Terri Vitar of PBS&J regarding length of marina breakwater, dated July 23, 2009.

II.E.2 Parks and Open Space Plan

Figure II-8 (Existing and Approved Parks and Open Space) illustrates the locations of various existing parks and open space on the Project site and in the nearby vicinity, including the CPSRA.

The Project would involve the creation of new parks and recreational opportunities, provide park improvements, and create new access to the shoreline. New parks would include destination parks, neighborhood parks, a sports field complex and multi-use lawn, the waterfront promenade, the waterfront recreation area, and the extension of the Bay Trail through the Project site. Approximately 10,000 net new trees would be planted at the Project site and in the community, along with shrubs and native habitat restoration. A detailed description of the proposed new and improved parks, including improvements to the CPSRA, is provided in Section III.P (Recreation), while a description of the Applicant's Draft Parks, Open Space, and Habitat Concept Plan is discussed in Section III.N (Biological Resources).

In total approximately 336.4 acres of open space would be provided (this includes a net reduction of 23.5 acres of CPSRA). Candlestick Point would include approximately 104.8 acres of parks and open space, including the CPSRA, and HPS Phase II would include approximately 231.6 acres of parks and open space.

Table II-6 (Proposed Parks and Open Space) presents the proposed park and open space in the Project. Figure II-9 (Proposed Parks and Open Space) illustrates the location of the proposed parks and open space and changes to the CPSRA. A brief description of the CPSRA, new parks and open space facilities, and the Bay Trail is provided below.

Candlestick Point State Recreation Area

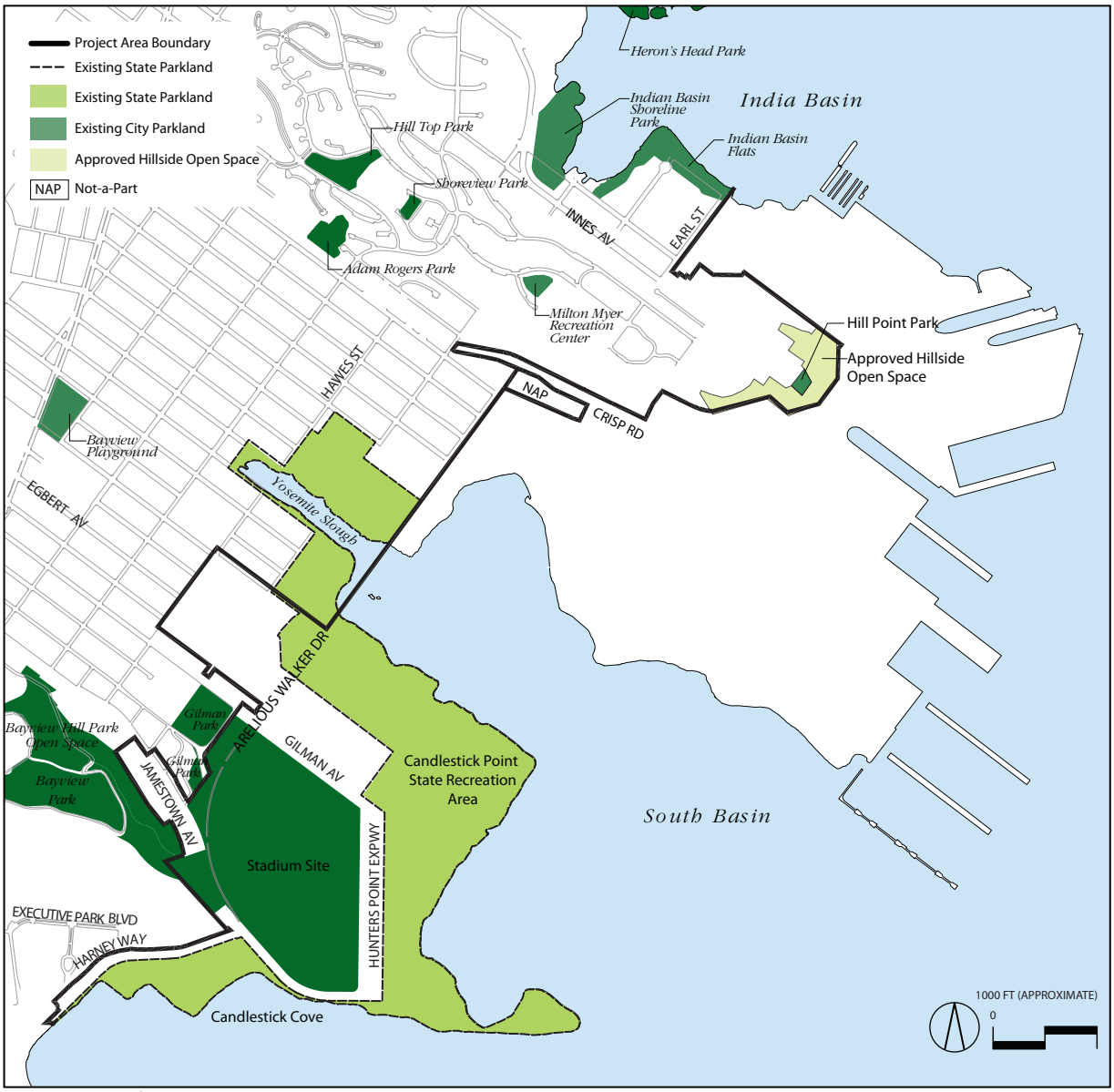
The Project includes the reconfiguration of the boundaries of CPSRA, as well as park improvements and an ongoing source of funding for park operation and maintenance. Table II-7 (Candlestick Point Proposed State Parks Reconfiguration) presents the proposed acreage of the areas proposed to be added to or removed from the Park, as identified by Senate Bill 792 (SB 792). SB 792 was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002*, the *Hunters Point Shipyard Public Trust Exchange Act*, and *Public Resources Code* Section 5006.8, and consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres.

Table II-6 Proposed Parks and Open Space

		Acres
CANDLESTICK POINT		
New Parks		
Alice Griffith Neighborhood Park		1.4
Candlestick Point Neighborhood Park		3.1
Bayview Gardens/Wedge Park		2.5
Mini-Wedge Park		1.1
	Subtotal	*8.1*
State Park Land		
The Last Port (includes new State Parkland)		14.6
The Neck (includes new State Parkland)		4.9
The Heart of the Park (includes new State Parkland)		15.4
The Point		6.1
Wind Meadow		11.4
The Last Rubble		24.5
Bayview Gardens North		9.5
Grasslands South		10.3
	Subtotal	*96.7*
	Total	***104.8***
HUNTERS POINT SHIPYARD PHASE II		
New Parks		
Northside Park		12.8
Waterfront Promenade		29.5
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		44.9
Grasslands Ecology Park at Parcel E-2		37.2
	Subtotal	*140.0*
New Sports Fields and Active Urban Recreation		
Dual-Use Sports Field Complex / Game Day and Stadium Event Parking		59.7
Waterfront Recreation Area		6.7
Dual-Use Multi-Use Lawn/Game Day and Stadium Event Parking		25.2
	Subtotal	*91.6*
	Total	***231.6***
TOTAL PARKS AND OPEN SPACE		
New Parks		148.1
New Dual-Use Sports Fields/Multi-Use Lawn and Active Urban Recreation		91.6
Existing State Parkland Improved (including 23.7 net loss of CPSRA)		96.7
	Total	***336.4***

SOURCE: Lennar Urban, 2009.

a. The 120.2-acre CPSRA would be reduced by 29.2 acres, and increased by 5.7 acres for a net reduction of 23.5 acres. The Neck, The Heart of the Park, and The Last Port are the three locations where new State Park Land would be added.



SOURCE: Lennar Urban, RHAA, 2009; PBS&J, 2010.

PBS&J 04.16.10 2056 | JCS | 10

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING AND APPROVED PARKS AND OPEN SPACE

FIGURE II-8

SOURCE: Lennar Urban, RHAA, 2009; PBS&J, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED PARKS AND OPEN SPACE

FIGURE II-9

Table II-7 Candlestick Point State Parks Reconfiguration	
	Candlestick Point (acres)
Existing State Park land at Candlestick Point	120.2
Area removed from State Park land	(29.2)
Area added to State Park land	5.7
Proposed State Park land at Candlestick Point	96.7

SOURCE: Lennar Urban, 2009.

The current *Candlestick Point State Recreation Area General Plan* was approved in 1978 and amended in 1987 and directs the long-range development and management of the recreation area.[39] Prior to construction of park improvements, the California Department of Parks and Recreation (CDPR) must undertake a public planning process and complete an update to the general plan.

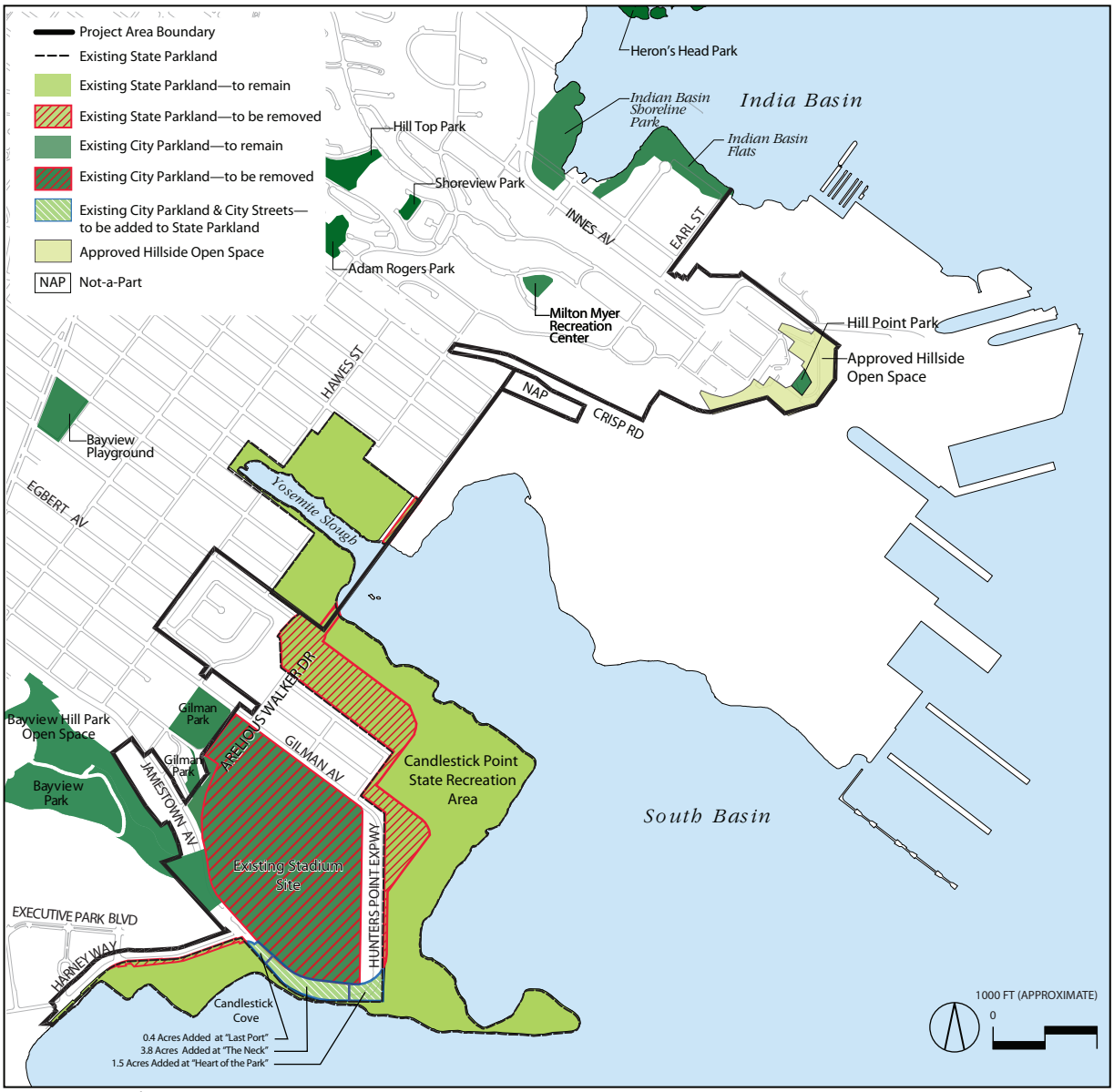
- Consistent with the current CPSRA General Plan and the CDPR mission, after Project development, the CPSRA would primarily contain areas of passive uses and minimal formal landscaping. The portion of the park that is currently undeveloped or used for Candlestick Park stadium parking would be substantially improved as part of the Project to enhance overall park aesthetics and landscape ecology; reconnect visitors to the bay shoreline; and provide direct access to the bay for swimming, fishing, kayaking, and windsurfing. Proposed Project improvements include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), a biofiltration pond to cleanse stormwater, the provision of habitat and opportunities for environmental education, 'Eco-Gardens,' and salt-marsh restoration. Although there would be a net decrease in the total area of the CPSRA, the recreational value of the new land and the improvements the area's overall value would increase.

The proposed improvement of the CPSRA would complete a continuous publicly accessible shoreline from Candlestick Point to HPS Phase II. Figure II-8 illustrates the locations of the current CPSRA, and Figure II-10 (Proposed CPSRA Reconfiguration) shows the proposed areas that would be added or removed. As shown in Figure II-9, the CPSRA open space would provide connections with other Project open space. CPSRA lands, whether improved or new, would be subject to the jurisdiction of the CDPR. Refer to Section III.P (Recreation) for a detailed discussion of the CPSRA.

New Parks

Overall, the Project would provide a substantial increase in the amount of developed, useable, high- quality parks, recreational facilities, and open space within the Project site. The Project would create a continuous network of interconnected recreational opportunities, promoting the use of the existing parks, such as the CPSRA, as well as the 239.7 acres of new parks, sports fields, and active urban recreation uses. The Project would provide a network of pedestrian and bike pathways that would connect Project uses to the adjacent neighborhoods and would ensure unrestricted public access to the parks and open space on the Project

[39] Department of Parks and Recreation, Candlestick Point State Recreation Area General Plan, (State Park and Recreation Commission Approval, November 1978, amended May 1987), March 1988.



SOURCE: Lennar Urban, RHAA, 2009; PBS&J 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED CPSRA RECONFIGURATION

FIGURE II-10

site and the Bay shoreline. Enhanced connectivity of on-site and off-site facilities and new neighborhood parks would allow integration of new and existing facilities into the citywide park network. The proposed bicycle and pedestrian pathways would facilitate dispersal of future demand, which would help to reduce the potential for localized physical deterioration. The improved connectivity would also direct regional users to proposed "destination" parks, parks designed to accommodate regional demand. In addition, the Project would provide a continuous series of waterfront parks from the northernmost part of HPS Phase II to the southernmost part of Candlestick Point.

In addition, proposed recreational facilities, such as paved athletic courts, plazas, and picnic areas, would also support a large number of users within a relatively small area. Recreational facilities proposed for the Project site also include a Sports Field Complex that would provide soccer/football, baseball, and volleyball fields, as well as warm-up fields, restrooms, and food concessions. The parking area for the Sports Field Complex would support parking during stadium events, but would be covered with specially engineered soils and turf to allow dual-use of the parking lot for athletic fields. Recreational facilities would also include a mix of active and passive areas of open lawns, dog runs, play areas, community gardens, and court games. Moreover, improved park facilities would provide a waterfront promenade, ecological open space areas, concessions, restrooms, and other uses that would allow the site to support a large service population.

The discussion below identifies the specific new facilities that are planned within Candlestick Point and HPS Phase II. These facilities are also identified in Table II-6, above, and shown on Figure II-9. Some features, such as the Bay Trail improvements, span both areas of the Project site.

Candlestick Point

Candlestick Point would include an extensive network of parks, ranging from the CPSRA to smaller parks distributed throughout the neighborhood. The Candlestick Point parks would be connected to other neighborhoods and open spaces by way of pedestrian-friendly green streets.

- The 1.4-acre Alice Griffith Neighborhood Park would extend for several blocks near the center of the neighborhood as an extension of Egbert Avenue.
- Candlestick Point North would include a 3.1-acre Candlestick Point Neighborhood Park in the center of the district.
- The Bayview Gardens/Wedge Park (2.5 acres) would serve as the 'commons' for the Candlestick Point development and link the residences to the CPSRA through an expansive view corridor. Specific programming would include an ecological garden, a main plaza, passive lawns, bioswale stormwater retention, and tot lots.
- The 1.1-acre Mini-Wedge Park in the Candlestick Point South district would serve as a primary connector between Candlestick Point and the CPSRA beach area.

These parks would be connected to other neighborhoods and open spaces within the community by way of pedestrian-friendly green streets.

Other Parks and Open Space

- Boulevard Parks within the Project site. A hybrid of street and park, the Boulevard Park Streets bring broad fingers of green space into the urban neighborhoods, linking interior parks with bay- front parks. These streets have a strong pedestrian scale and quality, and serve as public 'front yards' for

the neighborhoods. Broad landscaped medians or sidewalks (30-40' wide) are designed as mini-parks with garden seating areas. Boulevard Parks link the Alice Griffith and Central Candlestick communities with the CPSRA.

- Hillside Parks and Open Space within the Project site. The hillside parks and open space include the eastern 'tail' of Bayview Park and other hillside areas below Jamestown Road. The steeper areas and the flatter portion of Bayview Hill would be maintained in a more natural state.
- Yosemite Slough. While not located within the Project site, the Yosemite Slough is located directly adjacent to the Project site and is planned for restoration by the California State Parks and the California State Parks Foundation. The restoration will focus on providing new wetland habitat and environmental education opportunities. The proposed Yosemite Slough bridge would cross a small portion of the CPSRA on the southern side of the slough and pass along the edge of the eastern boundary of the CPSRA on the north side.

HPS Phase II

As with Candlestick Point, HPS Phase II would also include an extensive network of parks distributed throughout this portion of the Project site.

- Northside Park (12.8 acres), which would be located on the north shore of HPS Phase II, would offer a full suite of passive and active uses. The most active park uses are located at the southwestern portion of the park. This area includes community gardens, basketball, tennis, and volleyball courts and shade pavilion, children's playground, and restroom. The open-air African Marketplace would form an east-west promenade crossing the park, with looped pathways around the multi-use lawns providing additional multi-use space. To the northeast, the park takes on a more natural and passive character, with picnic/barbeque areas and shade shelters, and waterfront pathways.
- The Waterfront Promenade (29.5 acres) begins at the northern edge of the site and continues along the shoreline until terminating at the Waterfront Recreation Area described below. The promenade would provide evidence of the historic qualities of the industrial waterfront, which would be incorporated into tree bisques, seating areas, lawn panels, artworks, and interpretive gardens.
- Heritage Park (15.6 acres) would retain and reuse historic resources and materials as much as possible while utilizing modern design with industrial character. Children's play areas and areas of open lawn would be provided.
- Grasslands Ecology Park at Parcel E (44.9 acres) would contain native Eco-Gardens, passive lawns, native grasslands, windbreak groves, and landforms offering views of the bay and shoreline habitats. Site features could include group picnic areas, overlooks, a visitor/interpretive center, restrooms, and parking.
- Grasslands Ecology Park at E-2 (37.2 acres) would provide an open space area that includes picnic areas, grassy bird watching knolls, and overlooks. This passive recreation park would focus on views toward the Yosemite Slough Wetland Restoration area and provide opportunities for environmental education. The 44.9-acre Grasslands Ecology Park at Parcel E and the 37.2-acre Grasslands Ecology Park at Parcel E-2 on HPS Phase II are contiguous to CPSRA and may be offered to the CDPR by the Agency.
- The Sports Field Complex would include soccer/football, baseball, and volleyball fields, as well as warm-up fields, restrooms, and food concessions. The Sports Field Complex would be used for sporting events during day- and night-time hours. The surface of the fields would be seeded grass above top soil with synthetic fibers and other base materials to support vehicle parking and tailgating for 49ers fans on game days. To prevent rutting and damage to the fields, the design will employ a fiber-reinforcement system that is incorporated into fast-draining, sandy soils.

- A Multi-Use Lawn area would provide event-day parking for events at the stadium. At other times, this large open space would provide for informal recreational activities, sporting, and other events as needed.
- The Waterfront Recreation Area would provide a flexible waterfront open space focused on small boat access could include education and interpretive facilities focused on San Francisco Bay.

The Sports Field Complex and the Multi-Use Lawn both surround the proposed 49ers Stadium, providing parking for stadium-related events, as well as open space that would support a range of recreational activities, as described above. The surface of the fields would be seeded grass above top soil with synthetic fibers and other base materials to support vehicle parking.

Other Parks and Open Space

- Boulevard Parks within the Project site. A hybrid of street and park, the Boulevard Park Streets bring broad fingers of green space into the urban neighborhoods, linking interior parks with bay- front parks. These streets have a strong pedestrian scale and quality, and serve as public 'front yards' for the neighborhoods. Broad landscaped medians or sidewalks (30-40' wide) are designed as mini-parks with garden seating areas. Boulevard Park Streets connect the Hunters Point Hilltop community with Waterfront Park.
- Hillside Parks and Open Space Connection. A relatively small portion of the Hillside Park and Open Space located within HPS Phase II north of Crisp Road would provide a connection to the existing Hillside Parks and Open Space constructed in the Hunters Point Phase I project.
- Historic Landmark and Bay Naturalized Landscape within the Project site. The landmark Re-Gunning Crane will be retained, providing a dramatic juxtaposition of the site's industrial history with the resurgence of nature at the Bay's edge. Trails and boardwalks would lead to overlook points providing visitors with opportunities to view Bay wildlife.

Summary

Overall, the Project would provide a substantial increase in the amount of developed, useable, high- quality parks, recreational facilities, and open space within the Project site. The Project would create a continuous network of interconnected recreational opportunities, promoting the use of the existing parks, such as the CPSRA, as well as the 239.7 acres of new parks, sports fields, and active urban recreation uses. The Project would provide a network of pedestrian and bike pathways that would connect Project uses to the adjacent neighborhoods and would ensure unrestricted public access to the parks and open space on the Project site and the Bay shoreline. Enhanced connectivity of on-site and off-site facilities and new neighborhood parks would allow integration of new and existing facilities into the citywide park network. The proposed bicycle and pedestrian pathways would facilitate dispersal of future demand, which would help to reduce the potential for localized physical deterioration. The improved connectivity would also direct regional users to proposed "destination" parks, parks designed to accommodate regional demand. In addition, the Project would provide a continuous series of waterfront parks from the northernmost part of HPS Phase II to the southernmost part of Candlestick Point.

In addition, proposed recreational facilities, such as paved athletic courts, plazas, and picnic areas, would also support a large number of users within a relatively small area. Recreational facilities proposed for the Project site also include a Sports Field Complex that would provide soccer/football, baseball, and volleyball fields, as well as warm-up fields, restrooms, and food concessions. The parking area for the Sports Field Complex would support parking during stadium events, but would be covered with specially engineered

soils and turf to allow dual-use of the parking lot for athletic fields. Recreational facilities would also include a mix of active and passive areas of open lawns, dog runs, play areas, community gardens, and court games. Moreover, improved park facilities would provide a waterfront promenade, ecological open space areas, concessions, restrooms, and other uses that would allow the site to support a large service population.

The Bay Trail

The Bay Trail is a planned recreational corridor that, when complete, will encircle San Francisco Bay and San Pablo Bay with a continuous 500-mile network of bicycling and hiking trails. The Project would include the construction of the Bay Trail in the southeastern portion of San Francisco and ultimately connect to the existing trail along the India Basin shoreline. Trail improvements would include a pedestrian and bicycle trail along the shoreline with connections to the existing and new parks, from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the CPSRA, Yosemite Slough, and HPS Phase II shoreline to India Basin. The Bay Trail would be incorporated into the design of the parks described above. Figure II-9 illustrates the proposed Bay Trail.

Ecological Enhancement of Parks and Open Space Areas

The Project would provide opportunities for enhancing the ecological functions and values of the parks and open space areas. The following ecological enhancement measure would be implemented in open space areas outside the CPSRA. At the CPSRA, ecological enhancements would be identified during the CDPR public planning process and CPSRA general plan update described above and could include the enlisted measures or other measures. The Project would implement these measures in open space areas outside the CPSRA. Refer also to Section III.N (Biological Resources).

- **Control of non-native invasive species**—Non-native species would be removed during initial habitat enhancement efforts. Monitoring and ongoing removal/control would be implemented to ensure against the re-establishment and spread of these species on the site.
- **Incorporation of grasslands**—Native grasslands would be established on the site to support associated wildlife species.
- **Increase in tree/shrub cover**—Trees and shrubs would be planted throughout the Project site. Native vegetation would be favored, however, site-appropriate non-native trees and shrubs would also be considered.
- **Maintenance of habitat connectivity**—Parks and open space areas would be designed and maintained to maintain connectivity for less mobile animals including mammals, reptiles, and amphibians. Examples include maintenance of a vegetated band along the shoreline, and planting of vegetative cover that provides refuge for dispersing animals.
- **Creation of stormwater wetlands**—Stormwater treatment wetlands and biofiltration ponds would be incorporated into open space areas and would serve the dual functions of treating runoff while providing habitat for a variety of wildlife species.
- **Maintenance of refuge areas for waterbirds**—Park and open space facilities would create areas for waterbirds to roost at high tide that are somewhat removed from trails or other shoreline access points for humans. In addition, removal of landside portions of the three piers in the southeastern corner of HPS Phase II would prevent mammals from accessing those piers. The piers would be left in place to provide roosting sites for gulls, cormorants, pelicans, and terns.

- **Provision of nest boxes**—Nest boxes for birds would be placed in appropriate locations throughout parks and open space areas.

II.E.3 Transportation Improvements

The proposed Transportation Plan would serve travel needs of future residents, employees, and visitors at the Project. The Transportation Plan presents goals, principles, and strategies to fulfill the transportation and related sustainability objectives of the Project (refer to Section II.D [Project Objectives]). Major Transportation Plan principles include integration of new transportation networks with existing systems, and integrating land use patterns with multimodal street networks that would facilitate walking and cycling for internal trips and transit for trips of greater distance. The goals, principles, and strategies of the Transportation Plan would be supported by investment in infrastructure and services that would provide multiple alternatives to private auto travel. Some of the transportation improvements would require property acquisition.

Section III.D (Transportation and Circulation) describes the Transportation Plan in further detail; with a summary below.

Transportation Demand Management Plan

A Transportation Demand Management Plan (TDM) would be implemented to reduce automobile and light truck vehicle miles travelled and encourage residents, employees, and visitors to use alternative modes of travel, such as transit, walking, and bicycling. In addition, the TDM plan would include measures to reduce the demand for travel during peak times. The TDM plan would include the following strategies.

- **Transportation Coordinator and Website.** An on-site Transportation Coordinator would provide residents, employers, employees, and visitors with information regarding available transportation alternatives. The Transportation Coordinator would be responsible for implementing, monitoring, and improving the measures of the TDM plan. A website would include transportation-related data and real-time transit information
- **Employee TDM Programs.** Employers of 20 or more employees in the Project site would be required to participate in TDM programs that would encourage the use of transit and facilitate walking and bicycling by their employees.
- **Carpool/Vanpools.** The TDM would offer carpool and vanpool services. Designated spaces in parking facilities would be provided free to vanpools. The transit centers would have designated signed areas for informal carpooling.
- **Carshare Services.** Local carshare organizations would provide carshare vehicles throughout the Project site. Carshare services allow members to use vehicles when needed, paying based on how much they drive.
- **Other Strategies**
  - > Homeowner's dues would include the cost of transit passes for all households
  - > Information outreach would be provided to residents, employees and visitors on transit options Residential parking would be "unbundled" and sold or leased separately from the residential units
  - > Non-residential parking charges would vary according to market rates

> Exclusive bike lanes and frequent bus rapid transit (BRT) service would operate in dedicated lanes and with signal priority

> Regular periodic monitoring of Transportation Demand Management programs intended to encourage transit use and other alternative modes would be required, to measure effectiveness and to adjust programs to improve effectiveness

Roadway Network

The proposed street network would extend the existing grid of the adjacent BVHP neighborhood into the Project site. The internal street network would be composed of seven types of streets consistent with and classified by the *San Francisco Better Streets Plan* (Draft for Public Review, June 2008), including: Commercial Throughway; Residential Throughway, Neighborhood Commercial Street, Neighborhood Residential Street, Parkway, Park Edge Street and Alley. The proposed street network, including proposed off-site improvements, is illustrated in Figure II-11 (Proposed Street Network).

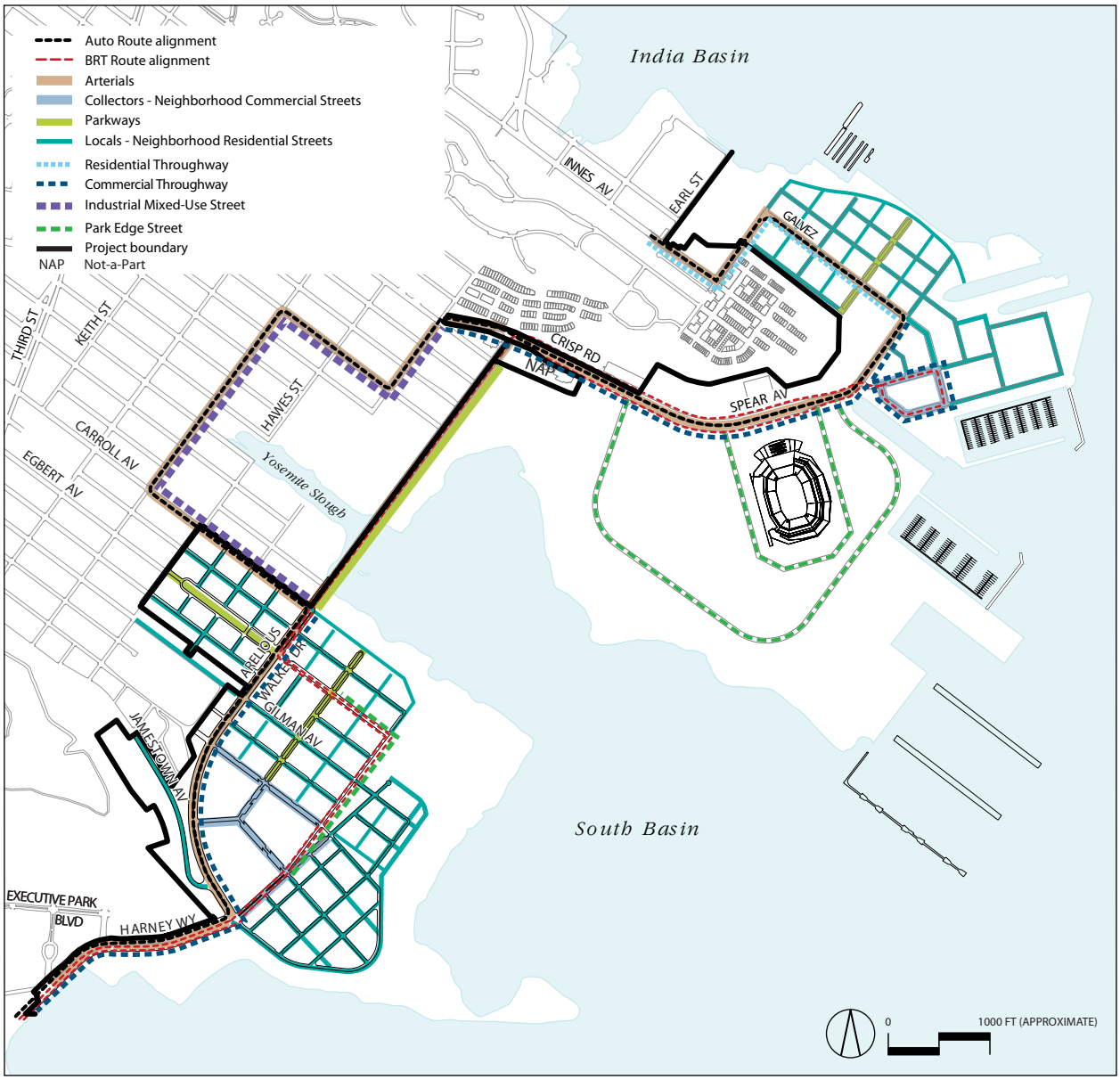
Roadway Improvements

The Project would improve existing roadways to serve Candlestick Point and Hunters Point Shipyard Phase II and surrounding Bayview and Hunters Point neighborhoods. Improvements would be within the Project boundaries, and off site as shown in Figure II-12 (Proposed Roadway Improvements).

Proposed roadway improvements, shown on Figure II-12 would include the following:

1. **Harney Way widening.** The existing four-lane Harney Way would be widened to the north and south of its existing alignment, and would be rebuilt to contain between two and three travel lanes in each direction, turn pockets, two BRT-only lanes, Class I and Class II bicycle facilities, new sidewalks, as well as landscaped area. Initially, the roadway would be rebuilt as a new five-lane roadway (with right-of-way reserved for additional lane(s) to be built in the future as needed for increased traffic levels). A Class II bicycle lane would be provided on the north side of the roadway, and a Class I bicycle path would be provided on the south side of the roadway. Two exclusive Bus Rapid Transit (BRT)[40] lanes would be constructed adjacent to the roadway on its north side. After games at the new 49ers stadium, left turns would be prohibited at the two Harney Way intersections with Thomas Mellon Drive and Executive Park Boulevard for a period to allow for the configuration of the roadway to change to four westbound auto lanes and one eastbound auto lane. Under the final configuration, a portion of the landscaped area installed as part of the initial widening would be rebuilt to provide lanes from the proposed Harney Interchange east to Arelious Walker Drive, if necessary.
2. **New roadway through Candlestick Point.** A new five-lane arterial roadway generally following the current alignment of Giants Drive and Arelious Walker Drive would serve Candlestick Point, with upgraded sidewalks, curb ramps, and street lights. The roadway would have a 13-foot-wide median to accommodate 11-foot-wide left-turn lanes at major intersections. The roadway would include new traffic signals at the intersections of Harney Way and Jamestown, Ingerson, Gilman, and Carroll Avenues.

[40] Bus Rapid Transit (BRT) is an integrated system of facilities, services, and amenities that collectively improves the speed, reliability, and identity of bus rapid transit. BRT combines stations, vehicles, services, running ways (e.g., curb bus lanes, median busways, mixed-flow lanes), and Intelligent Transportation Systems (ITS) elements into an integrated system.



SOURCE: Lennar Urban, Fehr & Peers, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED STREET NETWORK

FIGURE II-11

SOURCE: Fehr & Peers; AECOM, 2010.

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FIGURE II-12 Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED ROADWAY IMPROVEMENTS

3. **New and improved roadways on Crisp Road, Griffith Street, Thomas Avenue, Ingalls Street, and Arelious Walker Drive.** A four-lane roadway would connect Hunters Point to Candlestick Point. The roadway would begin at Hunters Point with the extension of Crisp Road to Griffith Street at Palou Avenue. The roadway would then continue on Griffith Street to Thomas Avenue and then on Thomas Avenue to Ingalls Street where it would proceed along Ingalls Street to Carroll Avenue. The new section of Crisp Road, Griffith Street, and Thomas Avenue would include four auto lanes and sidewalks, with on-street parking on Thomas Avenue. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on the portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased to be consistent with the sidewalks north of Yosemite Avenue to accommodate this change. A new traffic signal would be installed at the intersection of Thomas Avenue and Ingalls Street. The Project also proposes to connect Arelious Walker Drive to Crisp Road.
4. **Streetscape improvements.** Innes, Palou, and Gilman Avenues would serve as primary access corridors from the north for pedestrians, bicyclists, transit vehicles, and automobiles. Streetscape improvements, extending to Third Street on Palou and Gilman Avenues, and to Jennings Street on Innes Avenue, would include street trees, sidewalk plantings, furnishings, and paving treatments. Ingerson and Jamestown Avenues would be repaved and restriped from the Project site to Third Street.
5. **Yosemite Slough Bridge.** A new Yosemite Slough bridge would extend Arelious Walker Drive from Candlestick Point to Hunters Point Shipyard. The 81-foot-wide, seven-lane bridge would cross the slough at its narrowest point and would primarily function for transit, bicycle, and pedestrian use. Figure II-12 illustrates the bridge location. The bridge and its approach streets would have two dedicated 11-foot-wide BRT lanes and a separate 12-foot-wide Class I bicycle and pedestrian facility, which would be open at all times. The bridge would also have a 40-foot-wide greenway, which would be converted to four peak direction auto travel lanes on 49ers game days only. Those four lanes would be open on game days to vehicle traffic in the peak direction of travel. The roadway would be planted with grass and would serve as an open space amenity on all non-game days. Two-foot-tall barriers would separate the BRT lanes from the bicycle/pedestrian plaza and the vehicle lanes. The greenway would be designed to function as a stormwater treatment control facility for the auto travel lanes. Runoff from the BRT lanes would also be routed to the greenway and/or to land-based stormwater treatment facilities, in accordance with the City's requirements for stormwater treatment.

   The 81-foot-wide span across Yosemite Slough would be approximately 902 feet long with abutments on the north and south ends connecting the bridge to land. Eight piers, with two columns each, would support the bridge. The columns of the three southernmost piers would rest on bedrock. Ten sets of steel piles would be driven to support the columns of the five piers to the north. Section II.F.2 (Site Preparation) provides additional information regarding bridge construction. The bridge footings on either side of Yosemite Slough would require removal of portions of parkland from the CPSRA (red hatched areas). On the north side of the slough, this would result in 0.8 acre, and on the south side of the slough it would be part of 2.6 acres, that would be reconfigured. The bridge footings on the north side of the slough are located at the eastern edge of the park boundary. On the south end of the slough, the area removed for bridge footings would impinge approximately 300 feet or less (270 feet) through the CPSRA. On the south side, the bridge would extend Arelious Walker Drive through a portion of the CPSRA.

   Section III.D describes the bridge design further. Section III.E (Aesthetics) includes visual simulations of the bridge.
6. **Transportation Management System.** A transportation management system would be implemented for use during 49ers Game Days and special events held at the stadium. The system

would include the installation and coordination of signals at over 30 intersections in the Project and surrounding area using fiber-optic technology. Several variable message signs and lane use control signals would be installed on roadways with reversible lanes. Variable message signs would convey messages to Game Day or event patrons in private vehicles. A traffic control center near the 49ers Stadium would operate the system, connected to the larger SFMTA program.

Transit Services

Supported by Project revenues and infrastructure, the San Francisco Municipal Transportation Agency proposes the following transit services:

- Extending existing Muni bus routes to better serve the Project site
- Increasing frequencies on existing routes to provide more capacity
- Complementing existing routes with new transit facilities and routes that would serve the Project's proposed land use program and transit demand
- Connecting to regional transit with BRT

The Transportation Plan would propose new direct transit service to serve employment trips to and from downtown San Francisco. Connections to the regional transit network (BART and Caltrain) would serve employment centers in the South Bay. The proposed transit improvements are illustrated in Figure II-13 (Proposed Transit Improvements) and described below:

A. **Extended bus routes and new bus routes.** Existing Muni routes 24-Divisadero, 44-O-Shaughnessy, and 48-Quintara-24th Street would be extended to HPS Phase II; route 29 would terminate at Candlestick Point. Service frequencies on these lines would be increased. New Downtown Express routes would connect both Candlestick Point and HPS Phase II with the Financial District.

B. **Harney/Geneva BRT/Transit Preferential Street.** The Harney Way/Geneva Avenue corridor would have exclusive bus and BRT lanes between Hunters Point Transit Center and Bayshore Boulevard, through Candlestick Point and the Bayshore Caltrain Station.

C. **Hunters Point Transit Center.** Hunters Point Transit Center would serve HPS North and Hunters Point Village Center districts. The transit center would have approximately ten bus bays. Most bus lines serving HPS Phase II would terminate at the transit center.

D. **Bus Rapid Transit Stops.** BRT stops would be at Hunters Point Shipyard Transit Center, at three locations within Candlestick Point, and at two intermediate locations.

E. **Palou Avenue Transit Preferential Street.** One Muni line (24-Divisadero) would be extended along Palou Avenue to serve Hunters Point Shipyard Transit Center. Transit-priority technology would be installed on Palou Avenue including installation of new traffic signals. This would improve transit travel times and reliability on the 24-Divisadero and also the 23-Monterey and 44-O'Shaughnessy, which would continue to operate on Palou Avenue.

Many of the proposed transit lines would include transit priority systems, with roadway sensors that would detect approaching transit vehicles and would alter signal timing to improve transit efficiency.

SOURCE: Fehr & Peers; AECOM, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED TRANSIT IMPROVEMENTS

FIGURE II-13

Bicycle Circulation

Bicycle routes would provide connections within the Project site, to the surrounding neighborhoods, and to other parts of the City. Bicycle routes would be located along major roadways, consistent with City guidelines and adopted bicycle plans. As noted above, the Bay Trail, which would accommodate bicycle travel, would be extended along the entire Project waterfront. Secure bicycle parking would be provided in each commercial parking facility and residential garages (Table II-8 [Proposed Bicycle Parking and Shower and Locker Facilities]). New buildings with at least 10,000 gsf of office and community uses would provide locker and shower facilities. Figure II-14 (Proposed Bicycle Routes) illustrates the proposed bicycle route network. Bicycle facilities are described as Class I, which is a separated bicycle path or multi-use trail; Class II, which is a bicycle lane; and Class III, which is a bicycle route.

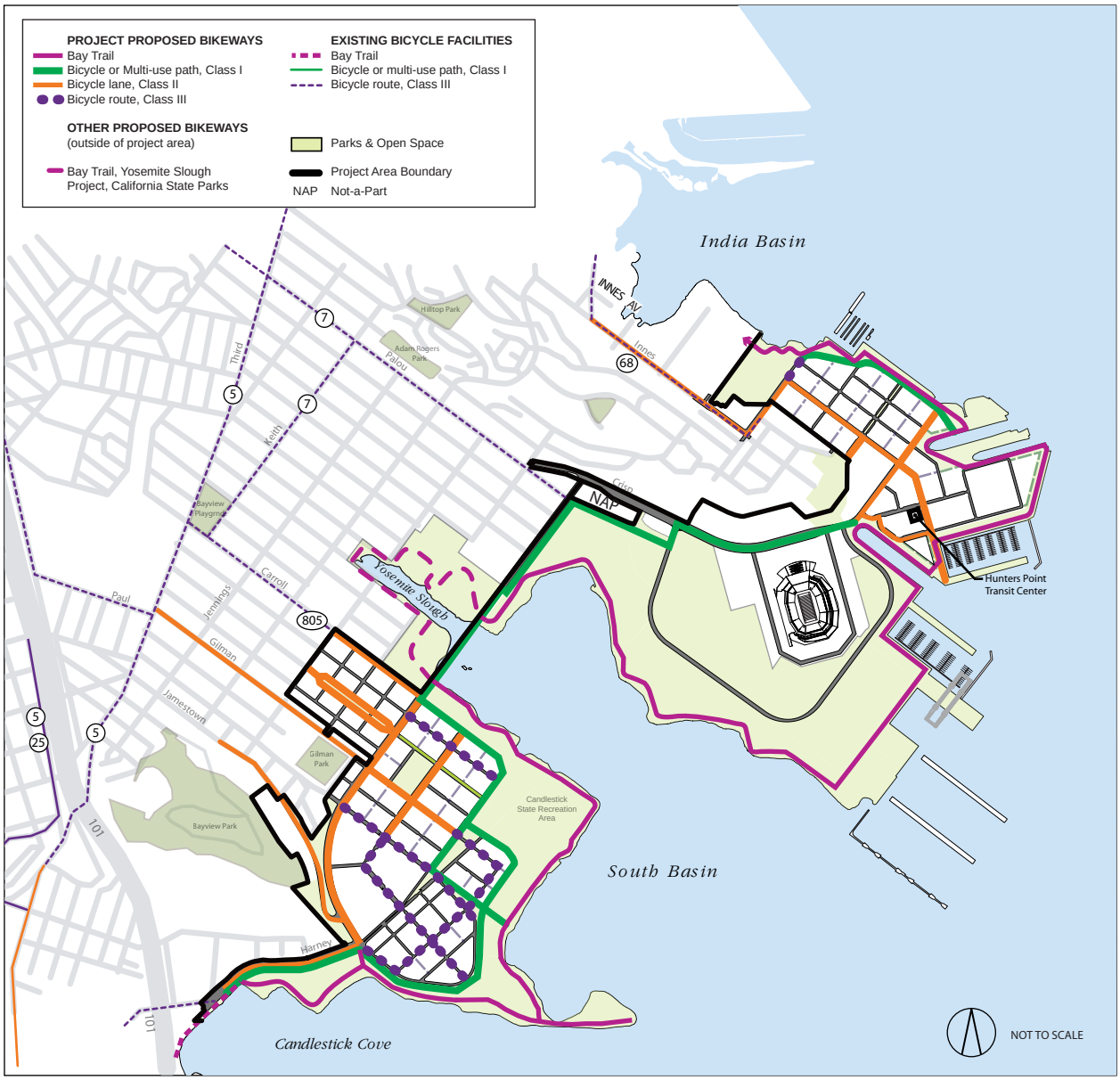
Table II-8 Proposed Bicycle Parking and Shower and Locker Facilities

Use or Activity	*Parking or Facility*	*Size of Project*
Residential	One Class 1 bicycle space per 2 units	Up to 50 units
	25 Class 1 bicycle spaces plus 1 Class 1 space for every 4 units over 50	Over 50 units
Medical, Office, Institutional, R&D, Theater, Hotel, Artist Space, and Community Use	Three bicycle spaces	10,000 and 20,000 gsf
	Six bicycle spaces	20,001 and 50,000 gsf
	12 bicycle spaces	Greater Than 50,000
Retail, Eating and Drinking Use	Three bicycle spaces	25,000 and 50,000 gsf
	Six bicycle spaces	50,001 and 100,000 gsf
	12 bicycle spaces	Greater Than 100,000
Structured Parking	One secure bicycle space per 20 auto spaces	< 500 parking spaces
	25 bicycle spaces plus 1 additional space for every 20 auto spaces over 500, up to a maximum of 100 bicycle spaces	500 parking spaces or more
Medical, Office, Institutional, R&D, Theater, Artist Space, and Community Use	One shower, two clothes lockers	10,000 and 20,000 gsf
	Two showers, four clothes lockers	20,001 and 50,000 gsf
	Four showers, eight clothes lockers	Greater Than 50,000
Retail, Eating and Drinking Use	One shower, two clothes lockers Two showers, four clothes lockers Four showers, eight clothes lockers	25,000 and 50,000 gsf
		50,001 and 100,000 gsf
		Greater Than 100,000

SOURCE: Lennar Urban, August 2009.
Hotel, residential, and live/work are excluded from shower/locker requirements.

Pedestrian Circulation

The Project pedestrian network, together with its land use design, would encourage walking as a primary mode of transportation within the Project site. Pedestrian facilities, such as sidewalk and multi-use pathways would allow access to transit facilities and to shopping, schools, and recreation. The interior roadway network would include traffic calming features to facilitate safe pedestrian travel. The streets would be designed to accommodate multi-modal travel, with curb extensions, corner extensions (or bulb- outs), raised crosswalks, comprehensive signage, street trees, narrow roadway lanes, and short blocks and other features to slow vehicle traffic. All pedestrian facilities would meet *Americans with Disabilities Act* (ADA) standards for accessibility and would be designed to conform to San Francisco's "Better Streets Plan" whenever possible.



SOURCE: Lennar Urban, Fehr & Peers, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE II-14

PROPOSED BICYCLE ROUTES

Parking

Parking would accommodate residents, employees, and visitors. Table II-9 (Maximum Proposed Parking) and Figure II-15 (Project Parking Supply) present the proposed parking rates and distribution of residential and commercial parking. Residential parking would be provided at a ratio of one space per unit. However, residential parking would be "unbundled" and each parking space sold or leased separately from an individual residential unit. The sale and lease rates would be set at fair market value, which would vary according to market pressures in the City. Commercial and visitor-serving land uses would be served by on- and off-street parking. All commercial parking facilities would be paid parking, with measures to discourage single-occupant automobile use, such as designation of preferred parking areas for bicycles, carpools, vanpools, and carshare vehicles. The performance venue/arena would share parking with proposed retail uses.

Table II-9 Maximum Proposed Parking

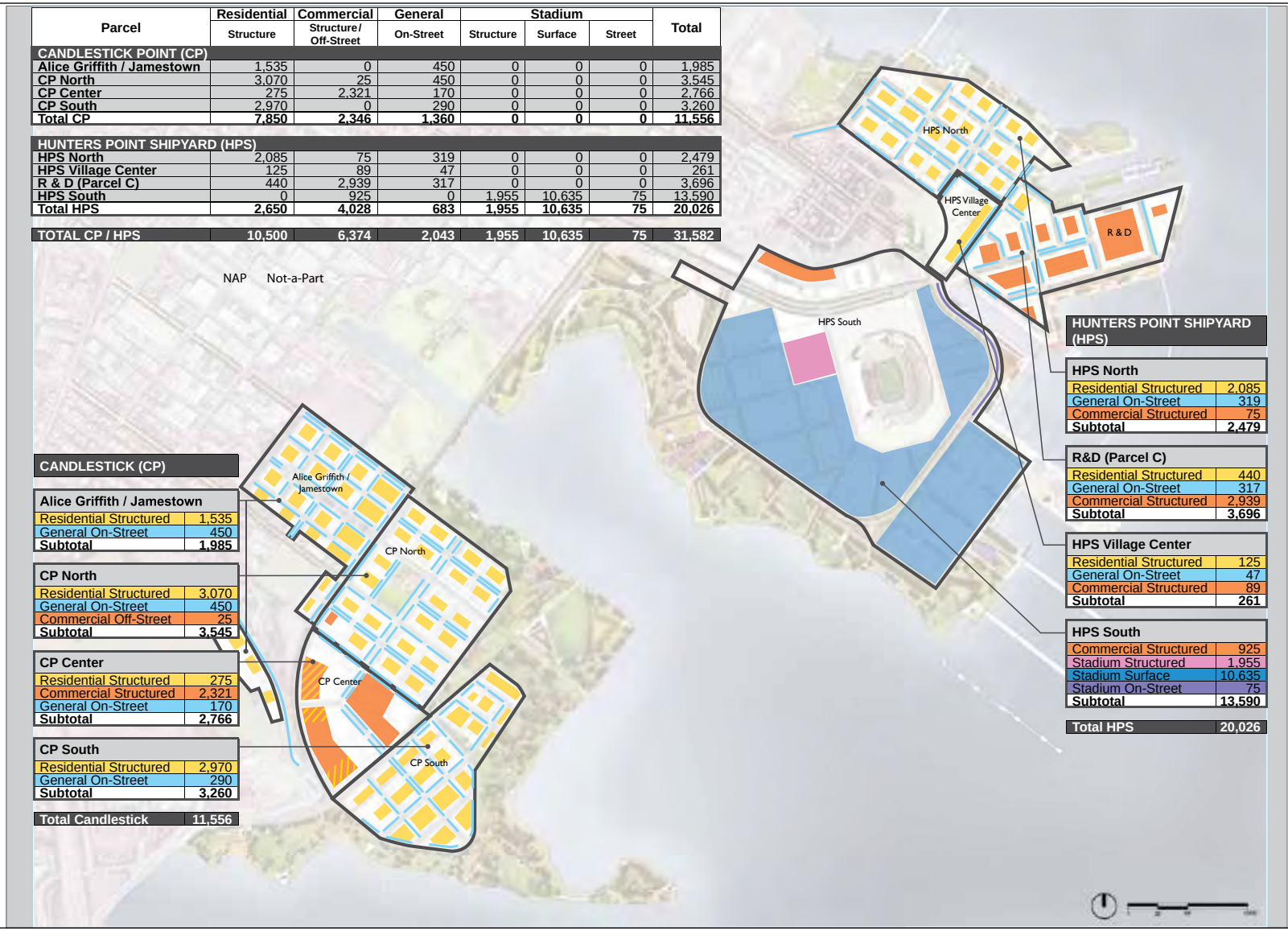
Use or Activity	*Hunters Point Shipyard Phase II*	*Candlestick Point*
Residential	1 for each dwelling unit	1 for each dwelling unit
Retail (Neighborhood Commercial)	3 for each 1,000 sf of occupied floor area where the floor area exceeds 5,000 sf	0
Retail (Regional)	—	2.7 for each 1,000 sf of occupied floor area where the occupied floor area exceeds 5,000 sf
Office	—	1 for each 1,000 sf of occupied floor area
R&D	1.3 for each 1,000 sf of occupied floor area[a]	—
Theater	—	1 for each 8 seats
Hotel	—	0.25 for each guest rooms
Stadium or Sports Arena	—	1 for each 15 seats, if shared
Artist Space	1 for each 2,000 sf of occupied floor area	—
Community Uses (TBD)	1 for each 2,000 sf of occupied floor area	1 for each 2,000 sf of occupied floor area

a. To achieve game day parking requirements if the 49ers stadium is constructed at Hunters Point Shipyard Phase II, R&D for Crisp Road only would be increased to 1.8.

Loading

The Project's loading program would facilitate access to freight vehicles (commercial delivery and moving trucks) and passenger vehicles (private vehicles, vans, and shuttles), while reducing conflicts with other transportation modes, particularly pedestrians. On-street loading spaces would serve as short-term parking near building entrances to meet the needs of disabled individuals, other visitors, and for commercial deliveries. The Redevelopment Plan documents would provide standards for the location and management of on-street loading spaces, including specific designation of street frontage at building entrances as short-term loading zones. On-street loading would be prohibited along BRT routes.

Parcel	Residential	Commercial	General	Stadium			Total
	Structure	Structure/ Off-Street	On-Street	Structure	Surface	Street	
CANDLESTICK POINT (CP)							
Alice Griffith / Jamestown	1,535	0	450	0	0	0	1,985
CP North	3,070	25	450	0	0	0	3,545
CP Center	275	2,321	170	0	0	0	2,766
CP South	2,970	0	290	0	0	0	3,260
Total CP	**7,850**	**2,346**	**1,360**	**0**	**0**	**0**	**11,556**
HUNTERS POINT SHIPYARD (HPS)							
HPS North	2,085	75	319	0	0	0	2,479
HPS Village Center	125	89	47	0	0	0	261
R & D (Parcel C)	440	2,939	317	0	0	0	3,696
HPS South	0	925	0	1,955	10,635	75	13,590
Total HPS	**2,650**	**4,028**	**683**	**1,955**	**10,635**	**75**	**20,026**
TOTAL CP / HPS	**10,500**	**6,374**	**2,043**	**1,955**	**10,635**	**75**	**31,582**



SOURCE: Fehr & Peers, 2009.

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FIGURE II-15

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT PARKING SUPPLY

Proposed off-street loading spaces would be based on the land use and the gross floor area, as shown in Table II-3. Table II-10 (Proposed Off-Street Loading Program) presents the guidelines for the proposed off-street loading program. Standards in the Redevelopment Plan documents would apply to the location and design of off-street loading spaces including consolidation of loading to minimize curb-cuts and driveways, no off-street loading curb-cuts on BRT routes or local streets with bicycle lanes, shared openings with parking facilities, and single loading facilities to serve multiple uses.

Table II-10 Proposed Off-Street Loading Program

Land Use	*Size of Use*	*Number of Spaces*
Retail, Wholesale, Manufacturing, Live/Work	0 to 10,000 sf	0
	10,001 to 60,000 sf	1
	60,001 to 100,000 sf	2
	> 100,000 sf	3 plus 1 for each additional 80,000 sf
All other uses (including residential)	0 to 100,000 sf	0
	100,001 to 200,000 sf	1
	200,001 to 500,000 sf	2
	> 500,000 sf	3 plus 1 for each additional 400,000 sf

SOURCE: Lennar Urban, 2009

II.E.4 Infrastructure Plan

The Infrastructure Plan would include a low-pressure water system, a reclaimed water system, an Auxiliary Water Supply System (AWSS), and separate sanitary sewer and storm drainage facilities. Trenches throughout the Project site would accommodate electrical, communication, and gas utilities. These systems are generally described below.

Low-Pressure Water System

The low-pressure water system would provide potable and fire protection water. The Project site is currently served by the City's low-pressure water system from the University Mound Reservoir. A preliminary water distribution model prepared for the Project indicated the need for increased flow capacity from the City water distribution system to meet the required system performance criteria under maximum day plus fire flow demand conditions. The Project could potentially include off-site improvements to convey additional flow to the Candlestick Point Project site from the University Mound pressure zone transmission mains on Third Street. The potential off-site improvements would involve upsizing existing pipelines within the rights-of-way on streets between Third Street and the project site. Low Pressure Water System Master Plans (LPW Master Plans) are being developed for Candlestick Point and HPS Phase II. The LPW Master Plans are anticipated to be completed by March 2010 and will identify the need for off-site improvements as well as the routing and scheduling of the construction of these improvements to meet the system performance criteria for the project.

Reclaimed Water System

The Project would provide a network of reclaimed-water mains for dual plumbing[41] in commercial buildings and for irrigation of landscaped areas. Reclaimed water mains would be connected to the potable water system until a source of reclaimed water is developed by the City and delivered to the Project site.

Auxiliary Water Supply System

The AWSS is a separate and distinct water supply system for fire protection purposes only. Candlestick Point and HPS Phase II are not currently served by the AWSS. Currently, there is a planned extension of the AWSS on Gilman Street from Ingalls Street to Candlestick Point. The Project would connect to this extension and provide an AWSS loop within Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road.

Sanitary Sewer

A combined storm sewer system serves most of San Francisco, where stormwater, along with residential and commercial sewage, is directed to treatment plants prior to being released to the San Francisco Bay or Pacific Ocean. The Project's separated sanitary sewer system would convey wastewater from Candlestick Point by gravity flow to the Gilman Avenue combined sewer, which flows to the Southeast Water Pollution Control Plant (SWPCP). The Project's separated sanitary sewer system would convey wastewater from Hunters Point Shipyard Phase II via pump stations to the Hunters Point Sewer Tunnel at Palou Avenue and Griffith Avenue and on to the SWPCP. A portion of the wastewater from Hunters Point Shipyard Phase II site may be directed to existing combined sewer lines located in Innes Avenue at Earl Street. As described below, the Project would have separated stormwater drainage systems.

Storm Drainage/Water Quality

The storm drainage system would handle stormwater by three methods; the particular method employed for any individual storm event would depend on the magnitude of the event. These methods include (1) treated storm flows; (2) a 5-year storm piped system; and (3) overland flow. The storm drainage system would be separated from the sanitary sewer system to reduce wet weather flows to the SWPCP.

On-site treatment would handle the majority of the stormwater generated by typical rainfall events (1.17-year storm). Examples of on-site treatment could include vegetated swales, flow-through planter boxes, permeable pavement, green rooftops, and rainwater cisterns. Larger rainfall events up to a five-year storm would be handled within the rights-of-way of every street in the Project site. Examples of these stormwater facilities include vegetated buffer strips, flow-through planter boxes, bioretention facilities, pervious surfaces, and subsurface detention vaults. Bioretention basins would also be constructed within parks and open space. Most stormwater runoff from up to a five-year storm event would be treated before it enters the storm drains allowing the system to discharge directly to San Francisco Bay without further management. Stormwater from larger storm events would be routed to the Bay by overland flow along a

[41] Dual plumbing refers to a system of separated water and wastewater lines.

network of street gutters and roadways. The overland flow stormwater system would fully contain a 100-year storm event. Also refer to Section III.M (Hydrology and Water Quality).

Joint Trenches

The joint trench systems for the Candlestick Point and Hunters Point Shipyard Phase II development plans will be based on the same criteria. The joint trench includes electrical, communications and gas utilities. A joint trench network will be developed for each development site. Major and minor joint trenches will be routed through the street network to provide power, communications, and gas facilities to the development areas.

II.E.5 Community Benefits

The Project includes funding, facilities, and programs intended to benefit the BVHP community. In addition to the improvements provided as part of the proposed development, such as new parks, transit and roadway improvements, artist replacement space and other public facilities, the Project provides funding for additional community benefits including workforce development, jobs, education, and community health and wellness programs. These community benefits, each of which would be more completely set forth in a Disposition and Development Agreement (DDA) between the Agency and the Project Applicant, are further described below.

Affordable Housing

The Affordable Housing Plan would provide for the development of approximately 3,345 affordable and below-market housing units on the project site. These housing units would include a variety of unit types, sizes, and structures, and a wide range of affordability levels subject to necessary governmental approvals. The Project would include the redevelopment of the Alice Griffith public housing site. To accommodate the needs of families, market rate, affordable, and below-market housing units would average 2.5 bedrooms (excluding those specifically offered to senior or disabled residents).

Community First Housing Fund

The Community First Housing Fund would assist qualifying residents in the purchase of market rate homes in District 10.[42]

Education

The Project includes contributions toward a scholarship fund to support educational opportunities for youth and adults up to 30 years old and education enhancements within the community, which may include new facilities or upgrades to existing education resources. The use of these funds will be determined through a community-based process that includes the San Francisco Unified School District.

[42] Bayview Hunters Point and Hunters Point Shipyard are within Supervisorial District 10 in the City and County of San Francisco.

Space within the Project would be dedicated to the provision of library services to supplement the expanded Bayview branch of the San Francisco Public Library (SFPL), including a reading room and automated book-lending machines integrated into community retail and public facilities.

Community Health and Wellness

The Project would provide funding to be used to create a center focused on the health and well-being of children, youth, and their families. The center will be developed and implemented in conjunction with the San Francisco District Attorney's Office, the San Francisco Department of Public Health, and others with expertise in the field.

Business Development/Community Asset Building

The Project includes a workforce development program designed to create a gateway to career development for residents of District 10 and construction assistance program to ensure that contractors from the BVHP area are given the opportunity to obtain needed insurance and technical assistance.

Parcels can be reserved for development with local developers or builders, including for-profit or non-profit organizations that either do business in and have a primary address in the BVHP area, or are owned with at least 50 percent ownership interest by an individual or individuals residing in the BVHP area. A Community Brokers/Realtors program would provide qualified community brokers and realtors with a referral fee for referring buyers of market rate homes, and providing advance access to homes in the Project to such brokers. Specialized programs include space for "business incubation" to jump-start the location and development of innovative business, including cleantech, greentech, biotech, arts and digital media, and space for an International African Marketplace for the display and sale of arts, crafts, clothing, books, and other goods. In addition to these programs, a 0.5 percent fee calculated on the gross sales price of all residential market rate homes will be paid directly into the Hunters Point Shipyard Fund. The use of these funds will be determined in coming months through a continued dialogue with the Hunters Point Shipyard Citizens Advisory Committee (CAC), the PAC, and the BVHP community.

II.E.6 Green Building Concepts

The Project would comply with all applicable provisions of the City's Green Building Ordinance, which is contained in Chapter 13c of the San Francisco Building Code, and would provide recycling, composting, and trash facilities as required by the City's specifications. The Project has set an energy efficiency performance target of 15 percent below the energy efficiency standards articulated in Title 24, Part 6 of the 2008 *California Code of Regulations* (CCR). Lennar Urban would include measures such as high performance glazing, efficient lighting, daylighting, shading, envelope optimization, reflective roofs, and natural ventilation in the Project design. ENERGY STAR appliances are proposed for all new residential units. In addition, Lennar Urban could also implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity; the use of solar thermal energy to provide space cooling with the use of absorption systems; and/or water for space heating and domestic water systems.

Lennar Urban has also voluntarily committed to constructing all Project buildings to the LEED® for Neighborhood Development Gold standard based on the Pilot Version of the rating system released in

June 2007.[43] Following the 2007 LEED® ND Pilot Program rating system, preliminary analysis indicates the Project could achieve approximately 63 points, which is in the LEED® ND Gold range, through strategies including but not limited to the following:

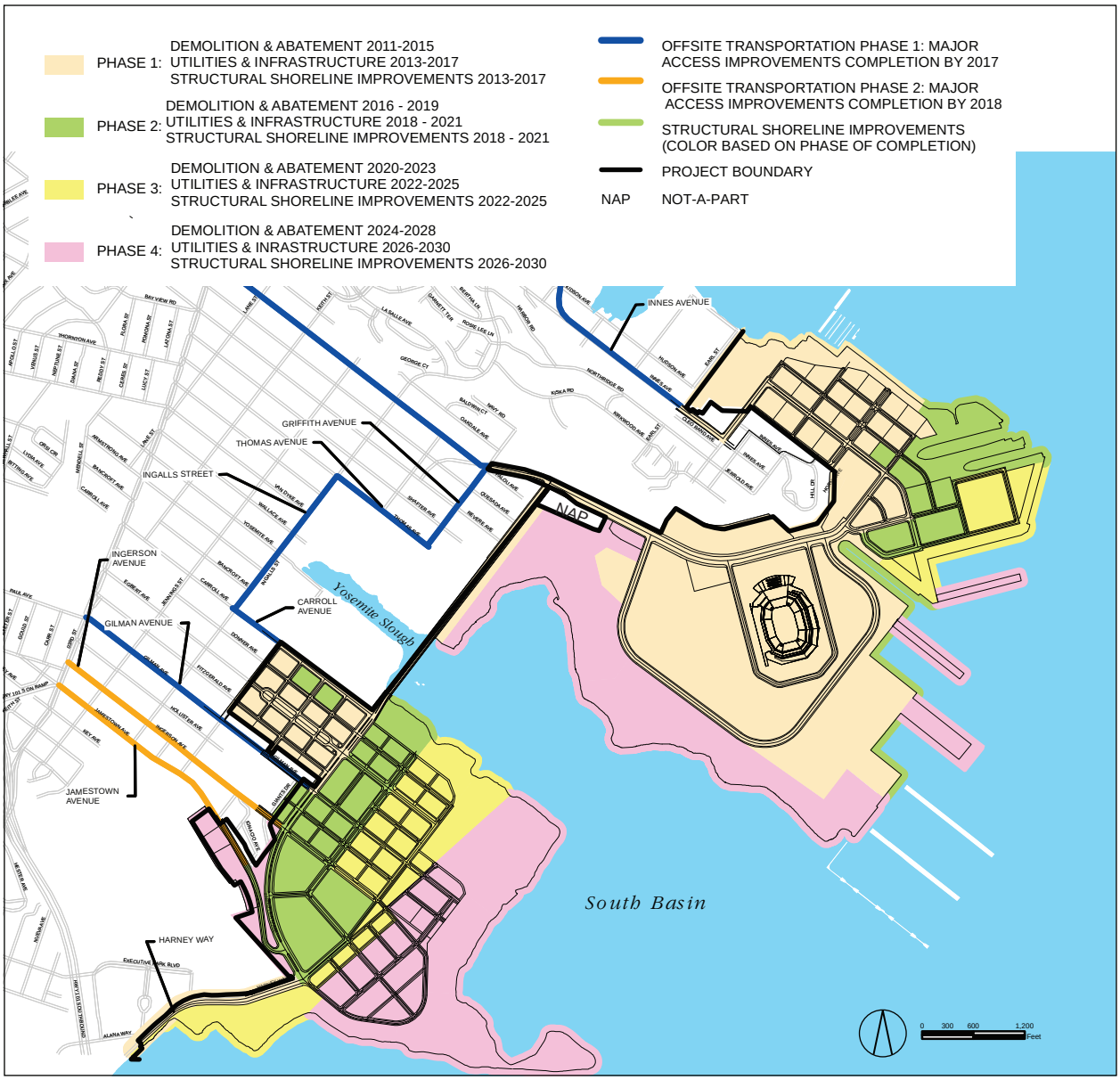
- Compact, infill development (including 90 percent of the new buildings fronting on public streets or open space)
- Enhanced habitat values
- Brownfield remediation and urban reuse
- Close proximity to transit and bicycle networks (75 percent of all development would be within ¼-mile walk to a transit stop and Class I, II, and III bikeways provide connections throughout the site and to the greater Bayview community)
- Urban design that promotes walking and discourages driving
- Diversity of land uses and housing types
- Affordable housing that supports a community of mixed ages and income
- Community participation in the community planning and design
- Compliance with the San Francisco Green Building Ordinance
- ENERGY STAR compliance to be documented by a Home Energy Rating System (HERS)
- Unbundled parking
- Drought tolerant plant species and the use of efficient irrigation systems such as drip irrigation, moisture sensors, and weather data-based controllers
- Tree-lined streets throughout the development and streetscape improvements extending from the Project Site to Third Avenue along Gilman and Palou
- Access to public space and recreational amenities through the creation of parks and playfields
- Efficient use of water and the potential use of recycled water for non-potable water uses such as irrigation, toilets, vehicle washing
- Progressive stormwater management to retain and treat stormwater on site and/or in adjacent areas

II.F DEVELOPMENT SCHEDULE

- It is anticipated that the Project would be constructed over time beginning in 2011 with full build-out by 2031, which represents an approximately 20-year construction period. Figure II-16 (Proposed Site Preparation Schedule) illustrates the site preparation sequence that precedes building construction. Figure II-17 (Proposed Building and Parks Construction Schedule) illustrates the building construction sequence.

  During construction, three basic types of activities would be expected (e.g., abatement and demolition; site preparation and earthwork/grading; and building construction). Some activities could occur simultaneously.

[43] Since the initial release of this standard, the rating system has undergone two public comment periods, and several credit requirements have changed. The LEED® ND rating system is currently being finalized for formal release by the US Green Building Council.



SOURCE: MACTEC, 2010.

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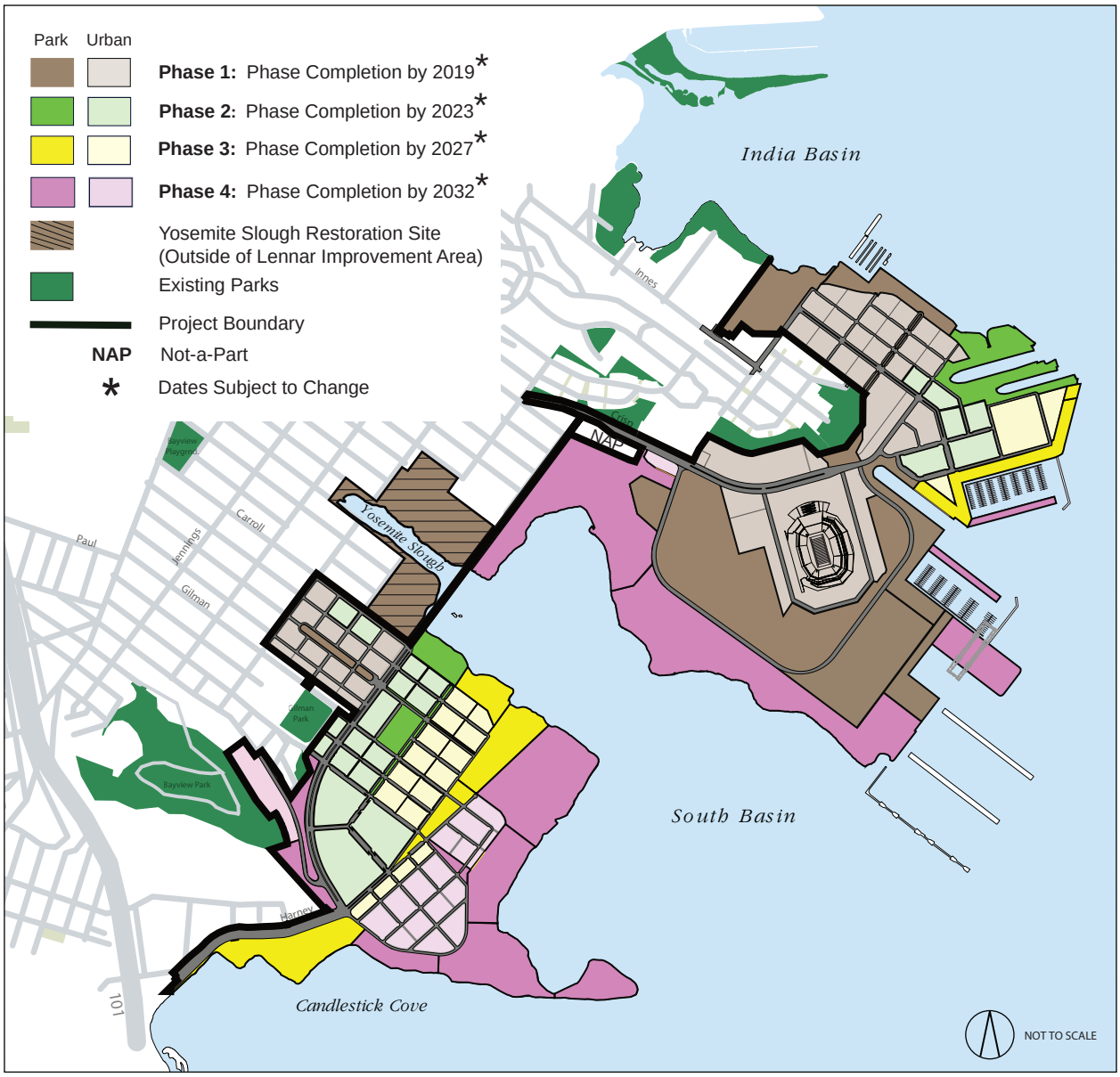
FIGURE II-16

PROPOSED SITE PREPARATION SCHEDULE



SOURCE: Lennar Urban, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE II-17

PROPOSED BUILDING AND PARKS CONSTRUCTION SCHEDULE

II.F.1 Abatement and Demolition

- Demolition of existing structures within the Project site would occur from 2011 to 2028. As the majority of development would occur on HPS Phase II during the first phase by 2019, most demolition would initially occur in that area of the Project site. In Candlestick Point, demolition of Alice Griffith housing would also occur in the first phase. The estimated quantity of demolition debris is presented in Table II-11 (Estimated Demolition Debris).

Table II-11 Estimated Demolition Debris

	Concrete[a] (tons)	*Wood[b] (tons)*	*Steel[c] (tons)*	*Misc. Debris[d,e] (tons)*	*Total[f] (tons)*
Candlestick Point					
Building Demolition	212,361	26,611	104,250	55,150	398,372
Road Demolition	2,021	0	33	24,255	26,309
Subtotal	*214,382*	*26,611*	*104,283*	*79,405*	*424,681*
Hunters Point Shipyard Phase II					
Building Demolition	179,652	137,572	74,480	86,119	477,823
Road Demolition	36,950	0	0	32,331	69,281
Subtotal	*216,602*	*137,572*	*74,480*	*118,450*	*547,104*
Total	***430,984***	***164,183***	***178,763***	***197,855***	***971,785***

SOURCE: Lennar Urban, 2009.

a. Concrete debris can be sized and recycled on site as pipe bedding or road base
b. Wood debris can be chipped and composted.
c. Scrap steel can be recycled off site.
d. Miscellaneous debris including glass, asphalt, plastic, etc would be transported and disposed of at a local landfill.
e. Asphalt included in Miscellaneous Debris may be recycled.
f. Quantity estimates are approximate. Pre-demolition surveys need to be performed to confirm size of structures and building material types.

Demolition activities would result in construction debris generated by the removal of structures, roads, and infrastructure. In total, approximately 971,787 tons of construction debris would be generated, including 424,681 tons from Candlestick Point and 547,104 tons from HPS Phase II. Most of the construction debris (45 percent) would consist of concrete, with the remaining debris consisting of wood (17 percent), steel (18 percent), and other miscellaneous debris (20 percent). It is assumed that the concrete debris would be recycled on site as pipe bedding or road base; the wood debris would be chipped and sent to the local landfill for disposal; and the steel would be recycled off site for other uses.

Candlestick Point

Demolition activities at Candlestick Point would include demolition of the existing Candlestick Park Stadium, associated parking lots, existing infrastructure, and structures on adjacent properties to be acquired, as well as demolition of the Alice Griffith public housing. Minor utilities would be abandoned in place or removed if they would interfere with installation of new infrastructure. Those include existing small-diameter combined sewer, the CPSRA sewer force main, storm drainage facilities, and low-pressure water main. Lennar Urban would be responsible for all demolition at Candlestick Point.

■ Hunters Point Shipyard Phase II

Demolition activities at HPS Phase II would include removal of structures and infrastructure. The Navy would remove Piers B and C and Drydocks 5, 6, and 7 and in addition demolish five buildings due to radiological concerns, prior to the transfer of HPS Phase II to the City. Lennar Urban would demolish all other buildings proposed for removal. As necessary, lead and asbestos abatement would occur in buildings prior to demolition. Existing infrastructure would be demolished to allow the construction of the new infrastructure. The Navy would remove most stormwater and sewer lines prior to transfer. Lennar Urban would remove existing surface improvements such as asphalt and concrete pavement, concrete sidewalk and other surface improvements.

II.F.2 Site Preparation and Earthwork/Grading

Major earthwork would be required at both Candlestick Point and HPS Phase II. An Earthwork Quantity Analysis was prepared to plan utilization and assignment of earthwork for all phases of development. Project grading requirements are summarized in Table II-12 (Summary of Project Site Grading Requirements) and described below.

Table II-12 Summary of Project Site Grading Requirements

	Candlestick Point (cubic yards)	*Hunters Point High Grade (cubic yards)*
Development Areas		
Excavation	1,111,000	82,500
Import Fill (Export from CP)	N/A	596,000
Import Fill	N/A	1,108,000
Trench Backfill (Utilities)	77,900	227,900
Navy cap (Area Less Open Space Areas)a	—	485,000
Open Space Areas		
Excavation	156,000	
Import Fill (Export from CP)		127,000
Import Fill		487,300
Navy cap (Open Space Areas)a		321,000
Excess Material when Completed	450,000	

SOURCE: Lennar Urban, 2009.

Crusted concrete from demolition activities estimated at 430,984 cubic yards will be used to reduce the imported fill quantities shown.

a. The "Navy cap" noted above refers to "cutting off an exposure pathway." In the context of the Parcel B Record of Decision, the soil remedy for IR sites 7/18 is referred to as a "cap," and the soil remedy for the remainder of the parcel is referred to as a "cover." The term "cover" as used in this EIR refers to a remedy requiring that the surface covers being installed (or remaining in place) to support the development (e.g. building slabs, pavement for roads, concrete for sidewalks, soil or grass for landscaped areas), meet certain specifications of thickness and be maintained to prevent breaches. The term "cap" as used in this EIR refers to a remedy requiring the installation of a surface specifically engineered to be placed on top of an area of known or suspected residual contamination (typically a landfill); the surface may be asphalt, concrete, or soil, but is generally more robust than a "cover" remedy, includes a "demarcation layer" of some sorts, is often accompanied with methane recovery or monitoring equipment, and more intensive operation and maintenance requirements than a "cover" remedy.

Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported on site. Development of the project's infrastructure would then follow, which would include streets, storm drains, collection and conveyance systems for water, sewer, and stormwater, and distribution systems for gas, electricity, and telephones.

Site preparation for the new 49ers stadium would occur during the first phase of construction. The existing Candlestick Park stadium would be maintained in service while the new 49ers stadium is built.

Candlestick Point

The estimate of earthwork grading requirements for Candlestick Point was based on a profile along the edge of development, which allows for overland flow and piped storm drainage flow. All earthwork is assumed to be used on site for Project grading and for grading improvements to the State Park land, or is exported to HPS Phase II. Hunters Point Shipyard soil shall not be used for grading adjustments within CPSRA. Table II-12 indicates the use and assignment of earthwork for all phases of development.

Hunters Point Shipyard Phase II

The estimate of earthwork grading requirements for HPS Phase II was based on a profile along the edge of development of Parcels B and C, which allows for overland flow and piped storm drainage flow. Earthwork at the 49ers stadium location and parking lot would be raised and graded by providing 5 feet of embankment over existing ground surface. This allows for buried pipeline with limited penetration of the existing soil. There would be some excavation on site. The material would be imported from Candlestick Point or other off-site sources.

Yosemite Slough Bridge

Construction of Yosemite Slough bridge would include: radiological excavations along the boundary of Parcel E to clear the HPS Phase II bridge approach from radiological restrictions; bridge and revetment construction; and construction of the streets leading to the bridge. In order to access the bridge construction site from the north (HPS Phase II), Parcel E radiological excavation must be completed first. Once completed, construction of the northern abutment, footings and piers would begin, as would construction of the bridge approaches from the south (Candlestick Point). Revetment construction to protect the shoreline parallel with each abutment would follow pier construction. The construction of footings and piers would require cofferdams for access to those specific sites. The bridge footings on either side of Yosemite Slough would require removal of portions of parkland from the CPSRA (red hatched areas). On the north side of the slough, this would result in 0.8 acre, and on the south side of the slough it would be part of 2.6 acres, that would be reconfigured. The bridge footings on the north side of the slough are located at the eastern edge of the park boundary. On the south end of the slough, the area removed for bridge footings would impinge approximately 300 feet or less (270 feet) through the CPSRA. On the south side, the bridge would extend Arelious Walker Drive through a portion of the CPSRA. Construction materials would be transported to the construction area from the South bay or by barge from the East bay. Deliveries of exceptional size (i.e., extra long or wide bridge construction components, equipment or materials) would be scheduled during hours with minimal traffic and coordinated with Caltrans authorities as appropriate.[44]

[44] MACTEC, *Work Program for the Construction of Yosemite Slough Bridge*, June 17, 2009.

Shoreline Improvements

The shoreline along the project boundary consists of a variety of edge conditions, many of which need to be improved to reduce erosion, provide public access, protect against present and future coastal flooding due to rising sea levels, and extend the life of the structural edges. There are several distinct types of edge conditions along the project shoreline[45] including piers, wharves, bulkheads, revetments, and natural shoreline consisting of sandy beaches and vegetated marsh. Piers and wharves are the structures that extend out over the water, bulkheads are vertical seawall structures, and revetments are sloped riprap or concrete protected edges.

The Project would repair and improve the existing shoreline edge at Candlestick Point and HPS Phase II. The proposed improvements are based on an assessment of the condition of the existing shoreline, which included analysis of the potential for coastal flooding and provided recommendations to reduce potential effects of storm-induced flooding and ongoing sea level rise. A subsequent investigation[46] provided more detailed information on existing shoreline conditions at the Project site, which permitted refinement of the recommended shoreline improvements.

Improvements to the shoreline along Candlestick Point would include the placement of additional (rock) riprap to improve the flood protection function of the existing riprap shoreline edge, the creation of a sandy recreational beach at the mid-point of the Wind Meadow reach along the Eastern Shoreline; and the creation of new tidal habitat in several locations. The creation or expansion of beaches or tidal habitat will be determined during the public general plan process for the CPSRA.

Along some areas of the HPS Phase II shoreline, piers and wharves have deteriorated due to structure age and lack of maintenance and near-shore settlement has occurred. Repairs of existing HPS Phase II shoreline structures vary based on type of edge and include repair of piles and deck, concrete crack repairs and rock buttresses along base of the drydocks, removal of upper portion of fill along bulkheads, and rip-rap placement. Several piers and drydocks would be modified by the removal of short section of piers and/or bulkheads (near the shore) to preclude public access, thereby creating opportunities for waterbirds to roost on the retained portions of these structures. In addition, some of the shoreline improvements associated with HPS Phase II include transforming the revetment edge in wave-protected reaches to a more natural looking shoreline by placing suitable fill to cover the revetment that would be constructed by the Navy, which may include Articulated Concrete Block (ACB) mats and/or marsh soils. Shoreline wave berms may be included along the southwest facing shoreline at the bayward end of the ACB mats.

Table II-13 (Summary of Shoreline Improvements at the Project Site) summarizes the proposed shoreline improvements within the Project site, while Table II-14 (Description of Existing Shoreline Conditions and Proposed Improvement Concepts) provides more detail regarding shoreline conditions and improvements.

[45] Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project, Initial Shoreline Assessment*, February 2009.
[46] Moffatt & Nichol, *Hunters Point Shoreline Structures Assessment*, October 2009.

Table II-13 Summary of Shoreline Improvements at the Project Site

			Proposed Shoreline Improvements											
			Repairs			Modifications								
Parcel or Area	*Location*	*Proposed Use*	*Deck*	*Piles*	*Walls*	*Riprap*	*Remove*	*Remove Portion*	*Slope Top of Wall*	*New Buttress*	*Sandy Beach*	*Tidal Habitat*	*Estimated Change in Shoreline Location (feet)*[d]
Candlestick Point													
North Shore	Grasslands South, Bayview Gardens North	Waterfront Recreation				X						X	+3.6
North Shore	Last Rubble	Waterfront Recreation				X							0
East Shore	Last Rubble, Heart of the Park	Waterfront Recreation				X							0
East Shore	Wind Meadow	Waterfront Recreation									X	X	+7.0
South Shore	Point, Heart of the Park, Neck, Last Port	Waterfront Recreation				X					X		+7.6
Hunters Point Shipyard, Phase II													
B	Drydocks 5 to 7	Northside Park/ Waterfront Promenade			X			X		X			0
	Wharf—Berths 55 to 61	Waterfront Promenade	X	X									0
C	Drydock 3	Heritage Park			X					X			0
	Wharf—Drydocks 2 & 3	Heritage Park					X						0
	Drydock 2	Heritage Park			X					X			0
	Wharf—Berths 1& 2	Waterfront Promenade[a]	X	X									0
	Berths 3 to 5	Waterfront Promenade			X				X				-18.3
	Berths 6 to 9	Waterfront Promenade[b]			X				X				-18.3
	Drydock 4	Waterfront Promenade			X					X			0
D	Berths 10 through 13	Waterfront Promenade[c]			X				X				-18.3
	Berth 14	Waterfront Promenade			X				X				-18.3
	Berths 16 to 20	Wildlife Habitat (Re-gunning Pier)						X	X			X	-60.4
	Berths 15, 21, 22, & 29	Waterfront Promenade							X	X			-18.5
	Berths 23 to 28	Wildlife Habitat						X				0	

Table II-13 Summary of Shoreline Improvements at the Project Site

			Proposed Shoreline Improvements										
			Repairs				Modifications						
Parcel or Area	*Location*	*Proposed Use*	*Deck*	*Piles*	*Walls*	*Riprap*	*Remove*	*Remove Portion*	*Slope Top of Wall*	*New Buttress*	*Sandy Beach*	*Tidal Habitat*	*Estimated Change in Shoreline Location (feet)*[d]
E	Berths 30 to 35	Wildlife Habitat						X				0	
	Berth 36	Grasslands Ecology Park							X	X			-18.5
	Berths 37 to 42	Wildlife Habitat						X					0
	Natural Edge/Riprap	Grasslands Ecology Park										X	+3.0
E2	Natural Edge/Riprap	Grasslands Ecology Park										X	+3.0

SOURCE: Moffatt & Nichol, Draft Hunters Point Shoreline Structures Assessment, September 2009.

At some locations, poor condition of existing shoreline features may require an alternate improvement.

a. Alternate improvement: remove or retain but add landscaping to deter public access and provide open space/habitat
b. Alternate improvement: remove and replace with concrete or steel bulkhead
c. Alternate improvement: remove and replace with concrete or steel bulkhead
d. These numbers represent an average estimated change in the shoreline at the specified location. A positive number indicates an increase in the shoreline (bay fill); and a negative number indicates a decrease in the shoreline (creation of bay).

Repair Descriptions:

Deck: Remove and replace deteriorated deck materials

Piles: Limit corrosion by wrapping or encasing piles in concrete and/or improve structural integrity by welding additional steel plates to the piles

Walls: Patch spalls, exposed and corroded reinforcing bars, or broken concrete. Add weep holes (to equalize pressure). As needed, install new sheet piles behind existing wall to form new wall (and remove existing wall).

Riprap: Place additional riprap (e.g., boulders) in the same location as existing riprap.

Modification Descriptions:

Remove: Remove deteriorated piers, pilings, and deck

Remove Portion: Remove a portion of pier near shoreline (to preclude public access)

Slope Top of Wall: Remove the top portion of a wall (e.g., 10–15 feet) and slope back top of wall at approximate slope of 2H:1V

New Buttress: Install new underwater rock and/or sand buttress at base of wall to improve structural stability of adjacent wall. Additional analysis will be required to determine the need for a buttress at some locations.

Sandy Beach: Slope back surface at approximate slope of 6H:1V to create sandy beach for recreational purposes

Tidal Habitat: Take advantage of sloped surface (or reduce slope where needed) to install aquatic plants and create new tidally-exposed habitat

Change in Shoreline Location: approximate change (in feet) in the location of shoreline (compared to existing conditions) which would result from proposed shoreline improvements.

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
North Shore	Grasslands South, Bayview Gardens North, Last Rubble	Waterfront Recreation	The slope protection on the north portion of the segment is a mixture of concrete rubble, rock riprap, and brick. The slope protection varies in size from cobbles to 4 feet in diameter. The north shoreline shows two small areas of unprotected shoreline that are fronted by exposed mud flats and vegetation.	Improve the present riprap edge along the shoreline to required elevations (placing riprap) to remain consistent with the present configuration. At the two reaches where opportunities exist for a natural edge, lay back the slope at a flatter configuration and plant marsh plantings.
East Shore	Last Rubble, Heart of the Park	Waterfront Recreation	The eastern shoreline is mainly riprap protected, except for one small sandy beach area built as a demonstration project by Art Ecology, a local community group. Burrowing from ground squirrels and other rodents was noted along the eastern, unprotected portions of this segment.	Improve the present riprap edge along the shoreline to required elevations (placing riprap) to remain consistent with the present configuration. At the mid-point of the Wind Meadow reach, construct a sandy recreational beach by laying the slope back at a 6H:1V or flatter configuration.
South Shore	Point, Heart of the Park, Neck, Last Port	Waterfront Recreation	The slope protection on the south portion of the Candlestick segment is primarily rock riprap. The slope protection varies in size from 1 to 4 feet in diameter. Along the majority of the south-facing shoreline, active erosion was observed in the higher portions of the embankment.	Improve the present riprap edge along the shoreline to required elevations (placing riprap) to remain consistent with the present configuration.
B	Drydocks 5 to 7	Northside Park/ Waterfront Promenade	The portion of shoreline west of the submarine drydocks (Drydocks 5, 6, 7) is an embankment protected by riprap, with some sandy pocket beach areas in the sheltered coves. This segment is part of the Navy's proposed remediation action, and is therefore not included in the analysis. The submarine drydocks consist of three slipways (Drydocks 5, 6, and 7) with concrete bulkheads on either side of each slipway. The portion between adjacent bulkheads consists of timber pile-supported deck. Portions of this segment are part of the Navy's remediation action, wherein the timber structures will be demolished and any contaminated sediments at the bottom of the drydocks will be dredged by the Navy. The remaining portions (shoreline and concrete structures perpendicular to shoreline) are part of the Redevelopment project.	This portion of shoreline will be improved to a riprap revetment by the Navy. The Navy will demolish the timber portions of the drydocks, and excavate any contaminated sediments. As part of the redevelopment project, the following improvements are envisioned: ■ Concrete bulkheads will be left in place but disconnected from the shoreline by demolishing the sections near the shoreline to prevent public access to the walls for safety reasons ■ For slope stability reasons, a rock buttress will be placed along the quay-wall extending from the bottom of the docks to about mid-tide level elevation (to be determined after geotechnical studies are complete) ■ Weep-holes will be constructed in the quay-wall above low tide elevation to relieve the loading from the backfill along the shoreline

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
	Wharf—Berths 55 to 61	Waterfront Promenade	The wharf at berths 55-61 is approximately 1,100 ft long. Berths 55, 56, 57, and 58 are located along two piers perpendicular to the wharf and constructed of timber decking and supported by timber piles. The pier for berths 59 and 60 (located just to the east of Berths 57 and 58) no longer exists. The wharf is a reinforced concrete structure and the timber piers are connected to the concrete wharf. Each bent is supported by four 4-ft-diameter concrete-filled caissons, the bents are spaced at 40 ft on center. The deck is a reinforced concrete slab supported by reinforced concrete beams and a deck elevation of +13.25 ft MLLW. The record drawings indicate precast beams and cast in place deck slab with a thickness of 14 inches. Based on drawing information found, the Design Live Load for this wharf is 600 pounds per square foot (psf). Furthermore, it is also designed for a truck crane loading of 21,000 lbs. per wheel (truck crane with 6 wheels). The riprap slope protection underneath the wharf is a minimum 2 ft thick based on the drawings and has a slope of 1.5 horizontal to 1 vertical (1.5H:1V). <u>Riprap-Protected Slope East of Berth 55 (Heritage Park)</u> This segment of shoreline is protected by concrete debris and riprap, and is part of the Navy's remediation action. Therefore, it is not included in the analysis.	The wharf at Berths 55 through 61 will need to be repaired and upgraded so that it can be used as a promenade for public access. Proposed repairs are: ■ Repairs to the 4-ft diameter steel caisson piles, which could range from limiting ongoing corrosion by wrapping or encasing the piles in concrete, to structural retrofit of piles by welding additional steel plates to the piles ■ Repairs to the reinforced concrete beams and deck slab including spall repair using shotcrete, grout, and/or epoxy injections. <u>Riprap Protected Slope East of Berth 55 (Heritage Park)</u> This portion of shoreline will be improved to a riprap revetment by the Navy.
C	Drydock 3	Heritage Park	Drydock 3 is a reinforced concrete structure with concrete sidewalls. The cross-section of the drydock varies from trapezoidal to rectangular, and the bottom surface is reinforced concrete. The concrete sidewalls vary between smooth-surfaced and stepped, depending on location and elevation. The concrete steps at some places of the concrete sidewalls apparently provided operational access during drydocking.	The drydock is proposed to remain at its current configuration but with the following modifications: ■ Add weep holes on the sidewall to reduce pressure behind it. These weep holes shall be located above the lowest tide and shall extend to near the top of the drydock walls ■ Add rock or sand buttress on the face of the drydock walls at the bottom. This will result in additional passive resistance with the intent of increasing slope stability ■ Patching all exposed spalls, replacement of reinforcing bars if necessary, epoxy material injection to cracks, and filling any holes and/or depressions.

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
	Wharf—Drydocks 2 & 3	Heritage Park	There is a timber pile-supported wharf designated as Wharf No. 2 located between Drydock No. 2 and 3. The deck framing consist of 4 x 12 timber planks, 4 x 14 stringers, and 14 x 14 timber pile caps. The supporting timber piles are spaced at 10 ft maximum. The deck elevation is indicated on the drawings as +12.0 ft MLLW.	This portion of shoreline will be removed by the Navy.
	Drydock 2	Heritage Park	Drydock 2 is very similar to Drydock 3 but smaller (shorter and shallower).	Drydock 2 is similar to Drydock 3 and the repairs described above shall be applied here too.
	Wharf—Berths 1& 2	Waterfront Promenade[a]	The wharf along Berths 1 and 2 is about 1000 ft long and 40 ft wide, and is backed by a concrete bulkhead along the shoreline. It is a reinforced concrete structure consisting of reinforced cast in place deck slab 8-inch thick, 16-inch wide x 36-inch deep beams, 2.5 ft wide x 5 ft deep girders, 4 ft wide x 6.5 ft deep pile caps, and 3 ft diameter concrete-filled steel cylindrical piles. There is a steel (wide-flange section) batter pile connected to the pile cap on the inboard side of the wharf. The batter piles are spaced at 6.25 ft. and the cylindrical piles are spaced at 25 ft on center. The deck elevation is indicated as +12.0 ft MLLW and has a rail track that runs parallel to the face of the wharf. The reviewed drawings indicate a design live load of 600 psf, 15-ton capacity Re-gunning crane, and 25-ton locomotive.	The wharf structure can be repaired and left in its present configuration. Recommended repairs include: ■ Construct a new sheet pile bulkhead behind the existing steel bulkhead because it has very likely corroded to a point past its serviceable life. The new sheet piles will be driven and tied back to form the new shoreline location. ■ Inspect the pile-supported wharf portion of the structure and assess structural integrity of the deck and piles. If the structure is determined to be adequate, or repairable to current codes with relatively minor repairs, conduct the repairs for continued use as a waterfront promenade for public use. If the investigation finds the structure to be significantly deficient or expensive to repair, it will be demolished or left in place with appropriate landscaping improvements that will deter public access and yet serve as open-space.
	Berths 3 to 5	Waterfront Promenade	The shoreline along Berths 3 and 4 is about 1100 ft long. It is constructed as a filled-in quay-wall 58 ft wide using timber cribs and filled with bank run rock fill. The top is at elevation +12.0 ft MLLW. The timber crib wall is founded on a 5 ft thick sand blanket and 18-inch sand piles spaced at 20 ft on centers. The facing of the wharf is a reinforced concrete wall anchored to the timber cribbing. Timber fenders are attached to the concrete wall (at the top), which extend below the MLLW line. The shoreline along Berth 5 is about 400 ft long. It was constructed exactly the same as the quay-wall along Berths 3 and 4.	Based on visual observations and engineering judgment, it is likely that the structure can be repaired and left in its present configuration. Recommended repairs would include the following: ■ Remove the upper portions (10 to 15 ft) of the concrete wall facing including the timber cribbing and bank run rock fill. The facing shall be sloped back at a 2H:1V slope and protected with rock facing to provide a more natural-looking surface without any additional bayfill and related impacts. ■ Patching all exposed spalls, replacement of reinforcing bars if necessary, epoxy material injection to cracks, and filling any holes and/or depressions.

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
	Berths 6 to 9	Waterfront Promenade[b]	The shoreline along Berths 6 through 9 is a 120 ft wide structure, 1000 ft long. Its construction is similar to the wharf for Berths 3 and 4 as filled-in quay-wall. The top is at elevation +12.0 ft MLLW. It is constructed using timber cribs extending the full width and height of the pier and filled with bank run rock fill. The timber crib wall is founded on a 5 ft thick sand blanket underneath a variable thickness bank run rock blanket. The facing of the wharves on each side of the pier is a reinforced concrete wall anchored to the timber cribbing and extends the full height of the pier. Timber fenders are attached to the concrete wall (at the top), which extend below the MLLW line. There are rail tracks along each side and parallel to the face of the pier.	Since this is the same type of construction as for Berths 3 and 4, the recommended modifications are the same. Refer to the description above. However, if additional investigations indicate that the timber cribs have been attacked by marine borers and are beyond repair, the repairs would be more extensive and may include complete demolition of the pier and replacement with a concrete or steel sheetpile bulkhead to serve as wave protection for the proposed marina in its lee.
	Drydock 4	Waterfront Promenade	Drydock 4 is a reinforced concrete structure with concrete sidewalls. The cross section of the drydock varies in trapezoidal shapes – the entrance has steeper sloping walls compared to the main drydock with flatter sloping walls. It is larger compared to Drydocks 2 and 3.	Since this is the same type of construction as for Drydocks 2 and 3, the recommended modifications are the same.
D	Berths 10 through 13	Waterfront Promenade[c]	The shoreline along Berths 10 through 13 was constructed in exactly the same manner as for Berths 6 through 9 (timber crib structure).	Since this is the same type of construction as for Berths 3 and 4, the recommended modifications are the same (see description above). However, if additional investigations indicate that the timber cribs have been attacked by marine borers and are beyond repair, the repairs would be more extensive and may include complete demolition of the pier and replacement with a concrete or steel sheetpile bulkhead to serve as wave protection for the proposed marina in its lee.

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
	Berths 14; Berths 16 to 20	Waterfront Promenade	The shoreline along Berth 14 was constructed exactly the same as for Berths 3 through 5 (timber crib structure). The shoreline along Berths 16 through 20 is a quay-wall type filled-in structure. The pier was designated by the navy as the Regunning Pier. It is 400 ft wide and about 1650 ft long on the north side and about 1000 ft on the south side. The quay wall around the pier is a cellular type cofferdam using steel sheet piles with semi-circular shaped facing (in plan). Each cell is about 31 ft x 65 ft in plan with the sheet piles varying in lengths from 64 ft to 76 ft. The longer piles are along the exterior portion of each cell which represents the wall of the pier. The shorter piles are the "tie back" piles buried within the pier. The cells are filled with hydraulic sand fill. At the outer edge of the cells near the top of the pier, the cells are filled with "Quarry run chips and fines" 9.5 ft thick 5 ft wide at the top and 15 ft wide at the bottom according to the drawings. The rest of the pier is filled with sand or selected bank run fill. Refer to Figure D4 for a typical section of the pier cellular wall and details of its upper portion. The top of the pier is at elevation +12 ft MLLW. Along the edges, there is a 1.5 ft thick concrete cap on top of the steel sheet piles which provides a straight edge for the pier facing. Timber fenders are installed along the face of the pier for berthing. The top is surfaced with a concrete pavement and asphalt-wearing surface. There are rail tracks on top of the pier. At this pier, there is a large overhead crane rated at 450 tons. The crane is supported by steel-framed towers and the foundation for the towers is supported by steel H-shaped piles (14HP89). There are four towers. Each tower is supported by four legs. The foundation for each leg has thirty H-shaped steel piles. The foundation for this crane is independent from the pier cellular wall system. Various sections of the sheet pile wall are dilapidated or sheared off above the water line. The shoreline supported by the sheet pile wall is eroding and failing in locations where the sheet pile wall has been undermined.	<u>Berth 14 (Waterfront Promenade)</u> Since this is the same type of construction as for Berths 3 and 4, the recommended modifications are the same. Refer to the description above. <u>Berths 16 through 20 (Wildlife Habitat)</u> Visual observations of advanced corrosion and deterioration indicate that the steel sheetpile cellular bulkhead, that provides the shoreline facing for the pier, is beyond repair. The improvement options that could be implemented include replacing the bulkhead with a riprap edge or replacing it with a natural shoreline edge. Since the proposed land use is wildlife habitat, the recommended modification is as follows: ■ Lay back the upper portion of the slope by saw-cutting the concrete deck at some distance from the shoreline and removing the sand fill at a 5H:1V slope (or gentler) ■ Cutting the steel sheet piles at about mid-height (approximately low tide) or even lower ■ Placing a coarse sand layer over the excavated slope to serve as substrate for grasses and other plants ■ Constructing a boardwalk along the centerline of the smaller peninsula created as described above

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
	Berths 15, 21, 22, & 29	Waterfront Promenade	The shoreline along Berths 15, 21, 22, and 29 are very similar in construction to the pier for berths 16 through 20 (described above). The wharf facing is a cellular type quay wall consisting of steel sheet piles with the cell filled with hydraulic sand fill. Each cell is 31 ft along the face of the wharf and about 65 ft wide. These berths do not have a concrete cap on top of the steel sheet piles.	Berth 15 (Waterfront Promenade) Visual observations of advanced corrosion and deterioration indicate that the steel sheetpile cellular bulkhead, that provides the shoreline facing for the pier, is beyond repair. The recommended improvement is to remove the upper portion (10 to 15 ft) of the sheetpile wall and sand fill behind it. The facing shall be sloped back at a 2H:1V slope and protected with rock facing to provide a more natural-looking surface without any additional bayfill and related impacts.
	Berths 23 to 28	Wildlife Habitat	The shoreline in this segment consists of a concrete pile-supported pier which is deteriorating. No active reuse is envisioned for the pier, and it will provide habitat for shorebirds.	Since the pier is very likely beyond its serviceable life, the recommended improvement is to detach it from shore and let it convert to a habitat for shorebirds that already use it. The detachment will prevent public access to this unstable pier, as well as raptors from accessing the habitat.
E	Berths 30 to 35	Wildlife Habitat	The shoreline in this segment consists of a concrete pile-supported pier which is deteriorating. No active reuse is envisioned for the pier, and it will provide habitat for shorebirds.	Since this is the same shoreline configuration (pier) as for Berths 23 through 28, the recommended modifications are the same (see description above).
	Berth 36	Grasslands Ecology Park	The shoreline in this segment is very similar in construction to Berth 29 (described above). The wharf facing is a cellular type quay wall consisting of steel sheet piles with the cell filled with hydraulic sand fill. Each cell is 31 ft along the face of the wharf and about 65 ft wide. The berth does not have a concrete cap on top of the steel sheet piles.	Since this is the same type of construction as for Berth 15, the recommended modifications are the same (see description above).
	Berth 37 to 42; Natural Edge/Riprap	Wildlife Habitat	The shoreline in this segment consists of a concrete pile-supported pier which is deteriorating. No active reuse is envisioned for the pier, and it will provide habitat for shorebirds. Riprap Protected Slope (Grasslands Ecology Park) The portion of shoreline west of Berth 36 is an embankment protected by a combination of riprap and concrete debris. Slope protection varies significantly in size from small rock and bricks, 4 to 8 inches in size, to large 4' blocks of concrete debris. This segment is part of the Navy's proposed remediation action, and is therefore not included in the analysis.	Since this is the same shoreline configuration (pier) as for Berths 23 through 28, the recommended modifications are the same (see description above). Riprap Protected Slope (Grasslands Ecology Park) This portion of shoreline will be improved to a riprap revetment by the Navy. However, the presence of vegetation and marshlands in this reach implies that there may be an opportunity to enhance this segment to a more natural marsh / mudflat edge. The recommended improvements include placing a suitable substrate in front of the revetment constructed by the Navy, and seeding it (or allowing natural propagation) with marsh plants.

Table II-14 Description of Existing Shoreline Conditions and Proposed Improvement Concepts

Parcel or Area	*Location*	*Proposed Use*	*Existing Shoreline Conditions*	*Proposed Improvement Concepts*
E2	Natural Edge/Riprap	Grasslands Ecology Park	The shoreline along Parcel E-2 is an unprotected natural shoreline with some debris (broken concrete, broken bricks and random pieces of rock) lining the edges, as well as beach-fronted, unprotected slopes. Similar to Parcel E, this segment of the project shoreline is characterized by slopes protected by riprap or concrete debris, as well as beach-fronted, unprotected slopes. The shoreline shows areas of erosion as well as areas of vegetation/habitat growth within the intertidal zone. Slope protection, where it exists, consists of small rock and bricks, 4 to 8 inches in size.	This portion of shoreline will be improved to a riprap revetment by the Navy. However, the presence of vegetation and marshlands in this reach implies that there may be an opportunity to enhance this segment to a more natural marsh / mudflat edge. The recommended improvements include placing a suitable substrate in front of the revetment constructed by the Navy, and seeding it (or allowing natural propagation) with marsh plants.

Figure II-18 (Shoreline Improvements within Agency Jurisdiction [Below High Tide Elevation]) identifies the areas where the lateral extent of shoreline may increase or decrease relative to the high tide elevation with the conceptual shoreline improvements. Figure II-19 (Shoreline Structures Recommended Work Map) and Figure II-20 (Natural Shoreline Recommended Work Map) show the type of shoreline treatment that will occur within the Project site; these figures also illustrate the specific locations of the various berths, drydocks, piers, and shorelines that are referenced in Table II-14 (in terms of conceptual improvements).

The proposed improvements would repair in place the existing shoreline edge or modify the location of the shoreline in one of the following ways: (1) the removal of the upper portion of a seawall or bulkhead structure (e.g., 10–15 feet) and the creation of a sloped surface (with an approximate slope of 2:1) in the intertidal and above tidal zones; and (2) the creation of a sandy beach (with an approximately slope of 6:1), which would provide recreational access to the Bay or serve as roosting habitat depending on location. The creation of the sloped surface at the top of selected locations would generally result in the shoreline being relocated between 3 feet and 20 feet landward at HPS Phase II. In addition, because of advanced corrosion and deterioration at the Re-gunning Pier (Berths 16 to 20), a natural shoreline edge would be created, which would result in the landward relocation of the shoreline edge by approximately 60 feet. The creation of sandy beaches and mudflats at Candlestick Point would result in the shoreline being located approximately 3.6 feet to 7.6 feet bayward due to placement of appropriate substrate for these improvements. The net effect of the proposed shoreline improvements would be to increase the land surface area by approximately 0.42 acre at Candlestick Point and reduce the land surface area by approximately 8.51 acres at HPS Phase II. The creation of new nearshore habitat in the form of mudflats, sandy beaches, and sloped tidally inundated areas are discussed more fully in Section III.N (Biological Resources).

In addition to shoreline improvement features and to reduce the impact of rising sea levels (Sea Level Rise [SLR]) that could adversely affect the Project site, the Project includes modification of the land surface through grading and importation of fill. These modifications would raise the surface elevation of low-lying areas, including portions of both the Candlestick Point and HPS Phase II areas, as discussed more fully in Section III.M (Hydrology and Water Quality).

Sea Level Rise

Rising sea levels is an ongoing phenomenon, which needs to be accounted for in the planning process to prevent future flooding or loss of infrastructure due to shoreline erosion. Planning for SLR includes three separate components (1) designing the perimeter to be flexible enough that crest elevations could be increased to prevent overtopping, (2) designing the development areas to be high enough that flooding would not occur around dwellings should the perimeter not function adequately, (3) designing the storm drainage system to be flexible enough that higher water levels would not result in overland flooding. It is obvious that while the perimeter and storm drain system could be upgraded over time, habitable structures cannot be raised.

There is no current guidance or policy establishing numeric values for development projects along the Bay edge. The Federal Emergency Management Agency (FEMA) maps flood zones based on present day rainfall and tidal conditions, but regional and local agencies have taken a more proactive approach in reviewing development proposals because of the public infrastructure element that they would be responsible for.

SOURCE: Moffat & Nichol Engineers, 2009; PBS&J, 2009.

PBS&J 10.17.09 08068 | JCS | 09

FIGURE II-18

Candlestick Point — Hunters Point Shipyard Phase II EIR

SHORELINE IMPROVEMENTS WITHIN AGENCY JURISDICTION (BELOW HIGH TIDE ELEVATION)

SOURCE: Moffatt & Nichol Engineers, 2009.

PBS&J 10.16.09 08068 | JCS | 09

FIGURE II-19

Candlestick Point — Hunters Point Shipyard Phase II EIR

SHORELINE STRUCTURES RECOMMENDED WORK MAP

SOURCE: Moffatt & Nichol Engineers, 2009.

PBS&J 10.16.09 08068 | JCS | 09

FIGURE II-20

Candlestick Point — Hunters Point Shipyard Phase II EIR

NATURAL SHORELINE RECOMMENDED WORK MAP

A project specific SLR study was undertaken[33] to develop planning and design guidance through the various phases of the project. The study was based on an exhaustive review of the literature, recent guidance from regional agencies, and knowledge of coastal processes of San Francisco Bay. The literature on SLR estimates varies widely, from an observed value of 8 inches per century (historical measurements) to 33 inches per century (Intergovernmental Panel on Climate Change [IPCC] maximum estimate). News articles and semi-empirical studies (Rahmstorf 2007) based in part on recent measurements of ice cap melt, have stated that the increase in SLR over the next 100 years could be much higher than those estimated by IPCC. Even among projections considered plausible, albeit high, by the CALFED Independent Science Board, a SLR of 36 inches would not occur until about 2075 to 2080 and by about 2100 the SLR could reach 55 inches. However, sea level observations since the publication date of the ice cap melt studies, although not conclusive to establish a new trend in SLR, do not show the accelerated SLR trajectory predicted by some of the reports.[34]

Project design for SLR meets both near term (2050) and long-range (2080) objectives; and in addition, incorporates an adaptive management strategy to address sea level rise for the most conservative estimates at 2100 and beyond. Since building structures are generally "immovable," whereas a perimeter and/or storm drain system can be adapted to keep up with changing sea levels, each was designed to a specific planning horizon as described below.

Development Design

For building structures, a 36-inch SLR allowance plus a freeboard of 6 inches was selected as the design criteria to use for design and construction. Per the most conservative rate of SLR (Rahmstorf, 2007 which includes ice-cap melt estimate), a SLR of 36 inches would not occur until about 2080,[35] which would be approximately 50 years beyond the last phase of construction for the project. Ongoing measurements of SLR from the scientific community would be incorporated into Monitoring and Adaptive Management Plans, administered by a Geologic Hazard Abatement District (GHAD) or other entity with similar funding responsibility.[36] This entity would guide the decision-making process for implementation of future improvements, such as raising the perimeter. The proposed Monitoring and Adaptive Management Plan for the project would have the appropriate language that specifies management actions that would need to occur should SLR exceed 36 inches. Should the SLR exceed 36 inches, the proposed project-specific funding mechanism (GHAD or similar) would pay for improvements.

Perimeter and Storm System Design

For the perimeter system, it is not practical to build a high wall around the project for a design condition that may not happen for several decades. At the same time, it is not prudent to build to present sea level conditions and keep raising it as sea levels rise. Therefore, an interim sea level rise estimate for the year

[33] Moffatt & Nichol, *Hunters Point Shoreline Structures Assessment*, October 2009.
[34] Rahmstorf, S., A. Cazenave, J.A. Church, J.E. Hansen, R.F. Keeling, D.E. Parker, and R.C.J. Somerville, 2007. Recent Climate Observations Compared to Projections. *Science* 316, p. 709.
[35] Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project Initial Shoreline Assessment*, prepared for Lennar Urban, February, 2009, op. cit.
[36] Moffatt & Nichol, *Hunters Point Shoreline Structures Assessment*, October 2009.

2050, as put forth by BCDC and the State Coastal Conservancy,[37] was selected as the design criteria to use for design and construction. That sea level is 16 inches higher than the present, which will ensure that adaptive management construction activities are not triggered until at least the year 2050. In addition, the shoreline and public access improvements have been designed with a development setback to allow any future increases in elevation to accommodate higher SLR values, should they occur.

For the storm drain system, the same approach as the perimeter system described above was adopted. This will avoid installing pumps and other appurtenances at the present time, when they are not needed, while still ensuring that an adaptation strategy and a funding mechanism exists for future management actions.

Figure II-21 (Flood Zones [Existing and with a 36-Inch Sea Level Rise]) shows the existing flood zone and the flood zone with a 36-inch SLR scenario. With the proposed project improvements at the time of construction, the flood zone would be reduced to that shown in Figure II-22 (Flood Zones [With Project]).

Figure II-23 (HPS Shoreline Section [Berths 55 to 60; Waterfront Promenade]), Figure II-24 (HPS Shoreline Section [Berths 3–5; Marina]), Figure II-25 (HPS Shoreline Section [Berths 16–20; Re-Gunning Pier]), and Figure II-26 (HPS Shoreline Section [Grasslands Ecology Park]) show typical sections along the edge of the proposed development. Figure II-27 (Candlestick Point Section [The Neck Area of the CPSRA]) shows proposed shoreline improvements at "The Neck" area of the CPSRA.

Building Construction

The Project would include a variety of land uses, such as residential, retail, office, research and development, hotel, artists' studios/art center, community services, parks and open space, football stadium, marina, performance venue, and associated parking. Building construction would include development of new buildings as well as planting of new landscaping, the application of architectural coatings on buildings, and paving of roadways and walkways (although these two activities would not occur simultaneously).

Controlled Rock Fragmentation

Different densities or hardness of rock exist at Candlestick Point: Franciscan Sandstone and Shale at the Alice Griffith Housing site and Franciscan Chert, Sandstone, Shale and Greenstone near Jamestown Avenue.[38] Harder areas of bedrock may require alternative techniques for removal such as controlled rock fragmentation. Controlled rock fragmentation technologies include pulse plasma rock fragmentation (PPRF), controlled foam or hydraulic injection, and controlled blasting. In some scenarios it may be necessary to utilize a combination of these techniques. Controlled blasting can typically be performed at noise levels below typical building demolition levels (80–100 dBA).

Current estimates indicate 98,000 cubic yards (CY) of rock near Jamestown Avenue may need to be removed using controlled rock fragmentation. To accomplish this within the 8-month demolition/grading time period, controlled rock fragmentation removing 12,000 CY each month will need to occur.

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[37][6] California State Coastal Conservancy. 2009. *Policy Statement on Climate Change*. Adopted at the June 4, 2009 Board Meeting. Available online at <http://www.scc.ca.gov/index.php?p=75&more=1>.
[38] MACTEC, *CP-HPSII Rock Fragmentation*, June 2009.

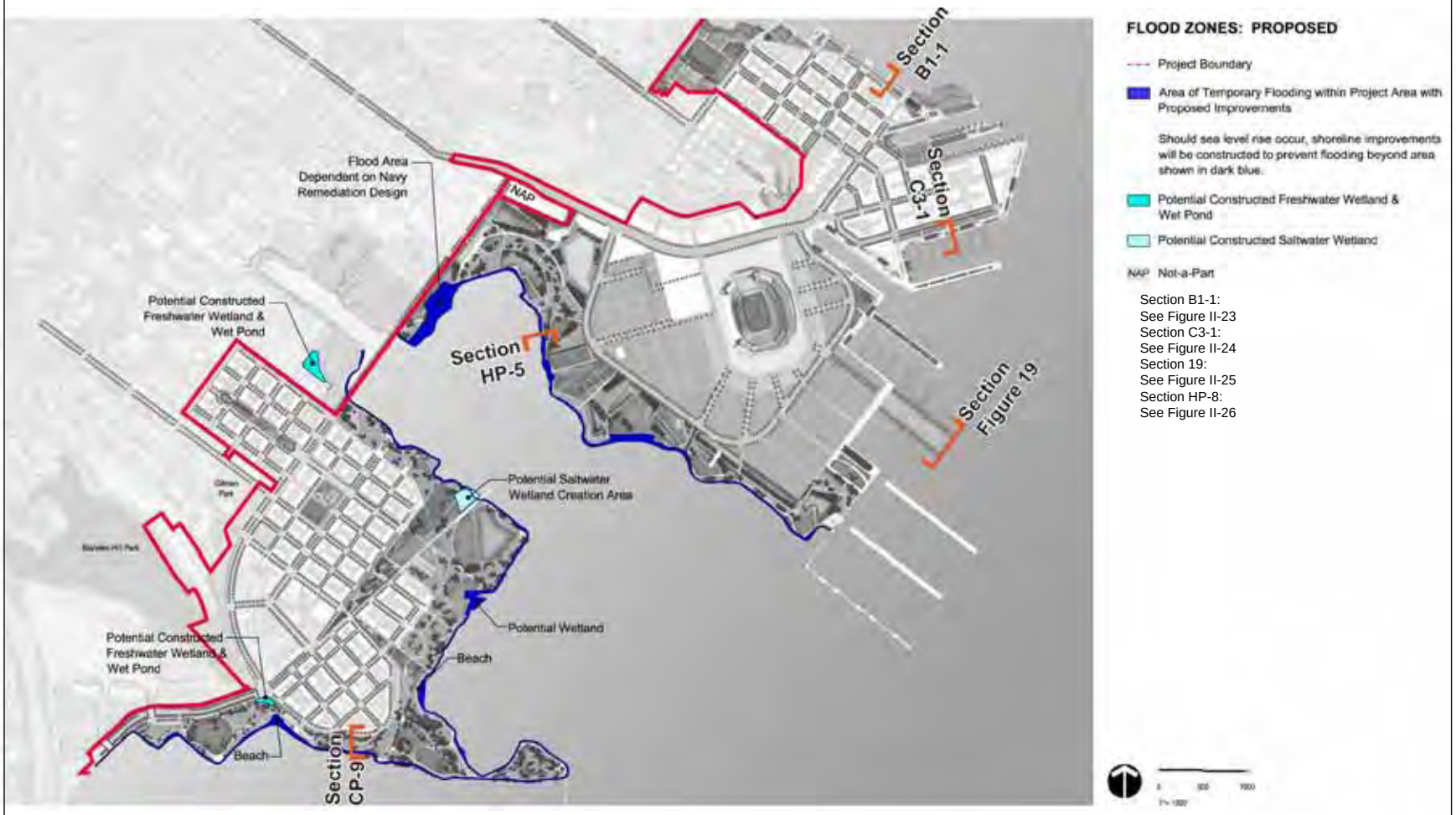
SOURCE: RHAA, 2009.

PBS&J 11.2.09 08068 | JCS | 09

FIGURE II-21

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING FLOOD ZONES AND SEA LEVEL RISE (WITH PROJECT LAND USE OVERLAY AND WITHOUT PROJECT SHORELINE AND GRADING IMPROVEMENTS)



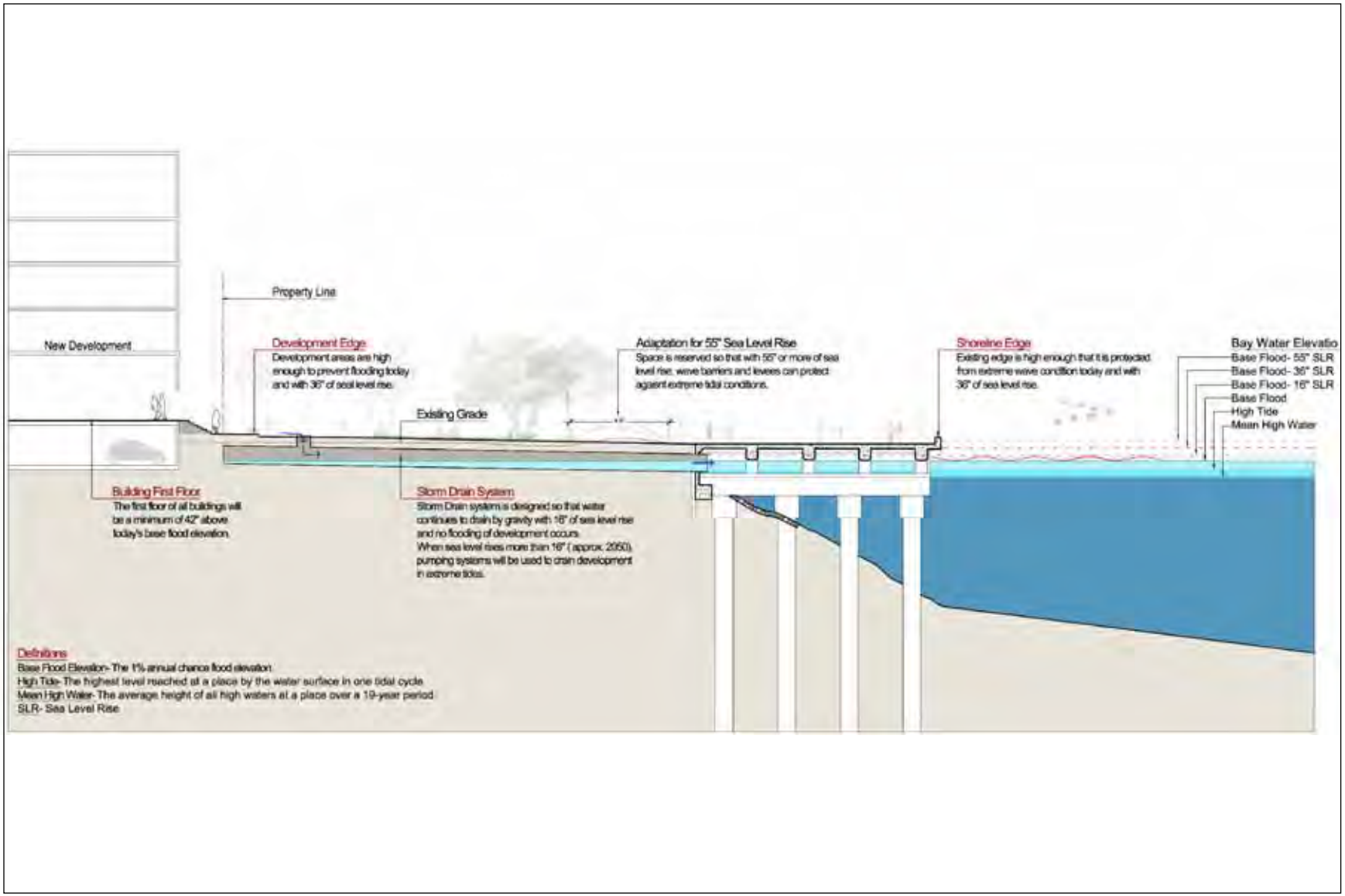
SOURCE: RHAA, 2009.

PBS&J 11.2.09 08068 | JCS | 09

FIGURE II-22

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING FLOOD ZONES AND SEA LEVEL RISE (WITH PROJECT LAND USE OVERLAY AND WITH PROJECT SHORELINE AND GRADING IMPROVEMENTS)



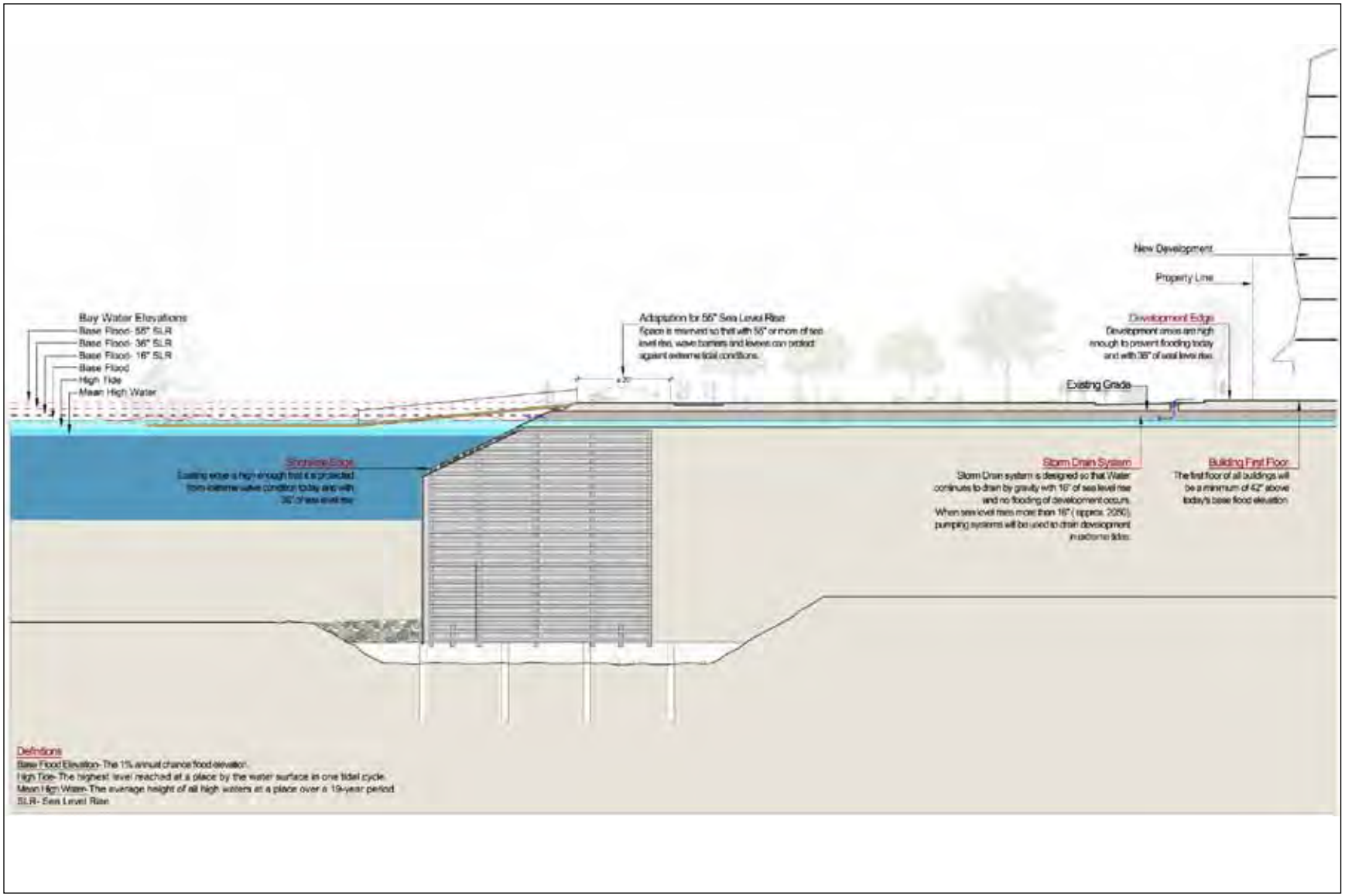
SOURCE: RHAA, 2009.

PBS&J 11.1.09 08068 | JCS | 09

FIGURE II-23

Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS SHORELINE SECTION
(BERTHS 55 TO 60; WATERFRONT PROMENADE)



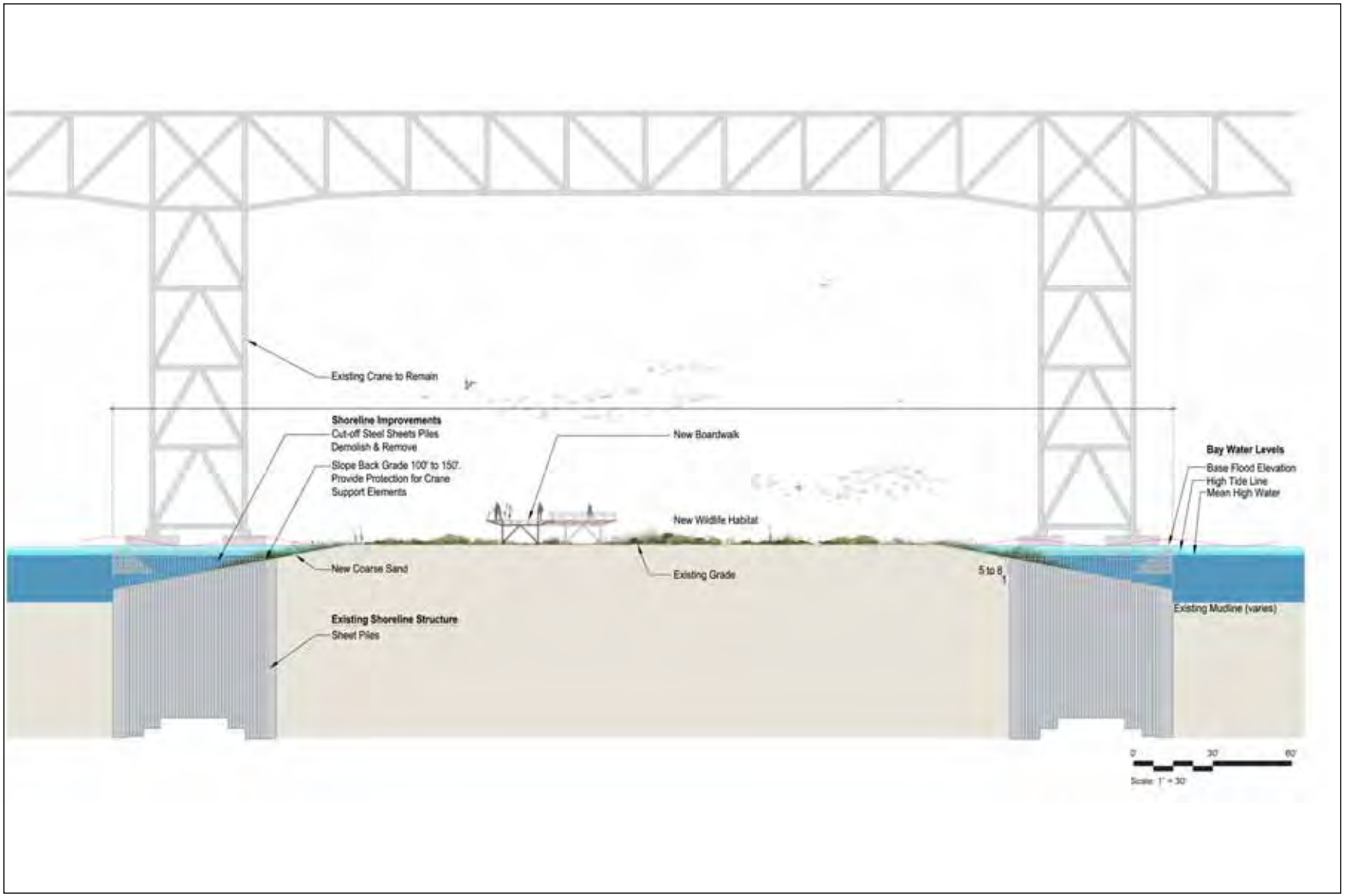
SOURCE: RHAA, 2009.

PBS&J 11.1.09 08068 | JCS | 09

FIGURE II-24

Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS SHORELINE SECTION (BERTHS 3-5; MARINA)



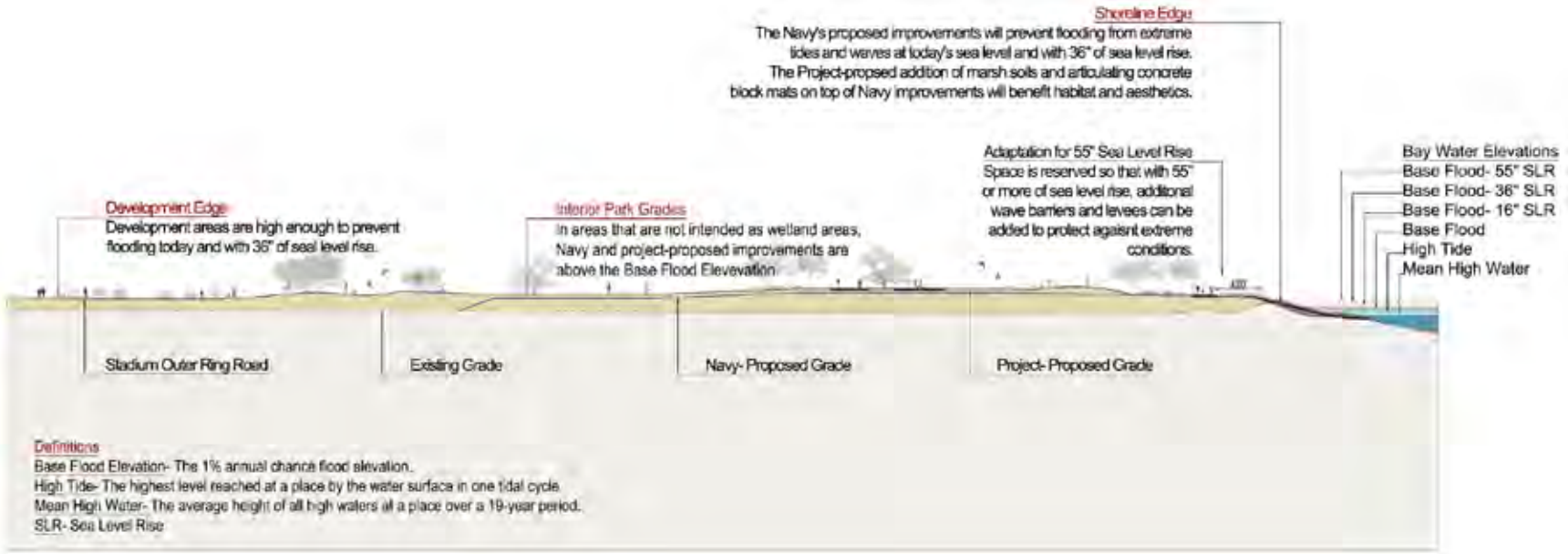
SOURCE: RHAA, 2009.

PBS&J 11.3.09 08068 | JCS | 09

FIGURE II-25

Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS SHORELINE SECTION (BERTHS 16-20; RE-GUNNING PIER)



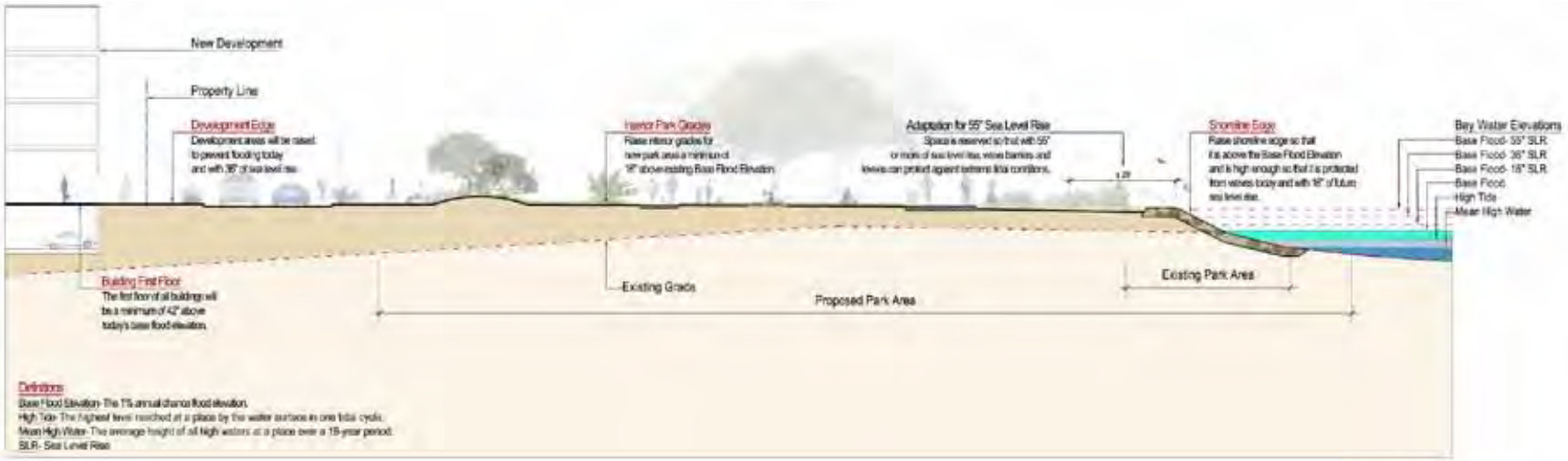
SOURCE: RHAA, 2009.

PBS&J 11.1.09 08068 | JCS | 09

FIGURE II-26

Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS SHORELINE SECTION (GRASSLANDS ECOLOGY PARK)



SOURCE: RHAA, 2009.

PBS&J 11.1.09 08068 | JCS | 09

FIGURE II-27

Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT SECTION (THE NECK AREA OF THE CPSRA)

Current estimates indicate approximately 42,000 CY of hard rock exists within three areas of Alice Griffith. For estimation purposes, it is assumed that each area may contain a third of this volume, or 14,000 CY of rock, that may need to be removed using controlled rock fragmentation. Removal of 14,000 CY of rock could potentially be completed within 6 weeks utilizing three events, each event producing approximately 4,500 CY, with a two-week period between events for set up and excavation. The three events within Alice Griffith would occur sequentially; approximately 17 weeks would be needed for these events at Alice Griffith. Figure II-16 identifies the location of controlled rock fragmentation. Table II-15 (Building Construction Completion Dates) presents the timeline for the proposed building construction for the Project.

Table II-15 Building Construction Completion Dates

Use	Development Area	Completion Year 2019	2023	2027	2032	Subtotal	Total
Residential Units	CP	1,000	1,515	2,505	2,830	*7,850*	***10,500***
	HPS	2,160	490	—	—	*2,650*	
Regional Retail (gsf)	CP	—	635,000	—	—	*635,000*	***635,000***
	HPS	—	—	—	—	—	
Neighborhood Retail (gsf)	CP	—	35,000	90,000	—	*125,000*	***250,000***
	HPS	84,000	41,000	—	—	*125,000*	
Office (gsf)	CP	—	150,000	—	—	*150,000*	***150,000***
	HPS	—	—	—	—	—	
Hotel (gsf)	CP	—	150,000	—	—	*150,000*	***150,000***
	HPS	—	—	—	—	—	
R&D (gsf)	CP	—	—	—	—	—	***2,500,000***
	HPS	583,000	842,000	1,075,000	—	*2,500,000*	
Community Services (gsf)	CP	—	50,000	—	—	*50,000*	***100,000***
	HPS	38,000	—	—	12,000	*50,000*	
Performance Venue (gsf/seats)	CP	—	10,000	—	—	*10,000*	***10,000***
Stadium (Seats)	HPS	69,000	—	—	—	*69,000*	***69,000***

SOURCE: Lennar Urban, 2009.

Candlestick Point

Building construction at Candlestick Point would coincide with completion of the utilities and roadways for each district. Building construction would begin in the Alice Griffith district. The second major phase of development would construct the Candlestick North district. Development of CP Center District and the Harney Way improvements would occur in Phase 3, and, finally, CP South and major shoreline improvements would be completed in Phase 4. Development in Candlestick Point would begin in 2012 and would conclude in 2031.

■ Hunters Point Shipyard Phase II

At Hunters Point Shipyard, new development would begin with the construction of the 49ers stadium, scheduled for completion during the 2014–2017 time period. Hunters Point North residential development and the mixed-use, neighborhood retail and residential development at Hunters Point Village Central District would begin in the first Major Phase and is planned for completion by 2023. Build-out of the Shipyard Research and Development Park is planned by 2027.

■ Parks and Open Space

In general, parks and open space would be developed at the same time as adjacent building construction (Figure II-17).

II.F.3 Construction Equipment

Site earthwork and grading activities would typically be performed using standard construction equipment, such as excavators, loaders, tractors, compactors, crushers, graders, and water trucks. Import fills and export material would be loaded and transported using loaders, standard size haul trucks, and barges. Site earthwork and grading activities would be planned to match yearly site development phasing. Typically, work would be performed during normal workdays and hours.

■ Candlestick Point

Construction activities in Candlestick Point would occur from 2012 through 2031.[39] Off-site roadway, utility, and shoreline improvements would be constructed beginning in 2013 and would align with vertical development. The number of construction workers on the site on any given day would vary from a low of 70 during the final stages of vertical development to a maximum of 328 workers during the peak years of development. The number of truck trips on any given day would vary from a low of 8 truck trips to a maximum of 96 during site preparation at Alice Griffith. The number of on-site equipment would be about 68 pieces during the height of construction activity.

■ Hunters Point Shipyard Phase II

Construction activities in HPS Phase II would occur from 2011 through 2031.[40] Off-site roadway, utility, and shoreline improvements would be constructed beginning in 2013 and would align with vertical development. The number of construction workers on the site on any given day would vary from a low of 15 workers during the final stage of vertical development to a maximum of 455 workers during the peak years of development. The number of truck trips on any given day would vary from a low of 4 to 8 trucks trips to a maximum of 288 truck trips primarily during the peak year of grading and infrastructure development. The number of on-site equipment would be about 65 pieces during the height of construction activity.

[39] Construction schedules may vary if the SF 49ers elect to renew their lease at the current stadium site until 2017 and potentially, an additional 5 years until 2023.
[40] Ibid.

II.G APPROVAL REQUIREMENTS

Consistent with the intended uses of the EIR, implementation of the Project would require multiple approvals from City, regional, state, and federal agencies. Table II-16 (Major Project Approvals) presents the major approval requirements.

Table II-16 Major Project Approvals

CITY AND COUNTY SAN FRANCISCO APPROVAL PROCESS AND PERMITS

Redevelopment Agency Commission

- Certifies the Final EIR
- Adopts CEQA findings, a statement of overriding considerations, and a mitigation monitoring and reporting program
- Reports to the Board of Supervisors on the amendments to Redevelopment Plans
- Approves amendments to the Hunters Point Shipyard Redevelopment Plan and approves amendments to the Hunters Point Shipyard Design for Development
- Approves amendments to the Bayview Hunters Point Redevelopment Plan and approves a Design for Development for Candlestick Point
- Approves land transfer agreements with the Navy, City, and State agencies
- Approves land transfer agreements with Port Commission, State Lands Commission, and California Department of Parks and Recreation (CDPR)
- Approves Disposition and Development Agreements and Owner Participation Agreements

Port Commission

- Approves land transfer agreements with Agency, State Lands Commission, and CDPR

Planning Commission

- Certifies the Final EIR
- Adopts CEQA findings, a statement of overriding considerations, and mitigation monitoring and reporting program
- Approves shadow determinations/impacts
- Adopts amendments to the General Plan to accommodate the Project and to find the amendments for the Hunters Point Shipyard Redevelopment Plan and Bayview Hunters Point Redevelopment Plan in conformity with the General Plan
- Adopts resolution recommending to the Board of Supervisors approval of amendments to the *Planning Code*/Zoning Maps for the Project
- Authorizes cooperative agreement with Redevelopment Agency

Board of Supervisors

- Affirms certification of Final EIR
- Adopts CEQA findings, a statement of overriding considerations, and a mitigation monitoring and reporting program
- Approves General Plan amendments
- Approves amendments to the Hunters Point Shipyard Redevelopment Plan and the Bayview Hunters Point Redevelopment Plan
- Approves amendments to the *Planning Code*/Zoning Maps
- Approves other necessary code amendments
- Approves a Joint Facilities Agreement and Tax Allocation Agreements with the Redevelopment Agency
- Approves land transfer agreements

San Francisco Public Utilities Commission

- Approves Project infrastructure for water, sewer, stormwater, and electricity

Department of Building Inspection

- Approves Project construction-related permits.

Table II-16 Major Project Approvals

Department of Public Works

- Approves subdivision maps, public improvements, and infrastructure

Department of Public Health

- Recommends ordinance to Board related to oversight of environmental controls; oversees compliance with environmental controls

Municipal Transportation Authority

- Approves transit improvements

Department of Recreation and Parks

- Approves land transfers
- Recommends to Planning Commission shadow determinations/impacts

Art Commission

- Approves public art and the design of public structures on City property

San Francisco Housing Authority

- Approves replacement of Alice Griffith public housing

REGIONAL, STATE, AND FEDERAL APPROVALS

Bay Conservation and Development Commission

- Approves amendments of the Bay Plan and Seaport Plan
- Approves permits for activities within BCDC's jurisdiction, including the proposed Yosemite Slough bridge
- Reviews Project land use plan for federal consistency under the Coastal Zone Management Act for activities not previously authorized in Consistency Determination No. CN 1-99

State Lands Commission

- Approves public trust land agreement

California Department of Parks and Recreation

- Approves agreement for the reconfiguration of Candlestick Point State Recreation Area
- Approves General Plan Amendment for the reconfiguration of Candlestick Point State Recreation Area

California Department of Transportation

- Approves any necessary encroachment permits for the Project roadway improvements

Regional Water Quality Control Board

- Approves Section 401 water quality certification

Bay Area Air Quality Management District

- Approves any necessary air quality permits for individual uses

Navy

- Authorizes the execution of necessary transactional documents with the Redevelopment Agency to transfer property at Hunters Point Shipyard for the development of the Project

US Army Corps of Engineers

- Approves permit for fill related to the Yosemite Slough bridge, shoreline improvements, and other activities.
- Consults with USFWS or NMFS regarding federally listed species prior to carrying out its discretionary authority under Section 404 of the CWA, pursuant to Section 7 of federal ESA
- Consults with NMFS regarding pile-driving and harbor seal and California sea lion prior to carrying out its discretionary authority under Section 404 of the CWA, pursuant to *Marine Mammal Protection Act*
- Consults with NMFS regarding modifying designated EFH prior to carrying out its discretionary authority under Section 404 of the CWA, pursuant to the *Magnuson-Stevens Act*

Table II-16 Major Project Approvals

Department of the Interior
■ Approves conversion of portions of Candlestick Point State Recreation Area reconfiguration improved with Land and Water Conservation Fund grants
US Coast Guard
■ Issues determination regarding vessel navigability for the Yosemite Slough bridge
US Department of Housing and Urban Development
■ Approves land transfer agreements involving Alice Griffith public housing site and funding approvals

SOURCE: Agency, Planning Department.

This Table is not intended to provide an exhaustive or exclusive list of the numerous public agency approvals that may be necessary to carry out the Project over its 20-year build-out. Instead, the Table provides a list of the major land use entitlements and related approvals anticipated from local and State agencies that may rely on this EIR. It is also anticipated that other permit and transactional approvals will be necessary as these major entitlements are implemented and that the approving public agencies, to the extent required by law, will rely on this EIR, in accordance with the requirements of CEQA and the CEQA Guidelines, in granting such approvals. This Table also lists federal agencies that would have jurisdiction over certain aspects of the Project.

II.G.1 General Plan Amendments, Planning Code Amendments, Redevelopment Plan Amendments

Implementation of the Project includes amendments to the *Bayview Hunters Point Redevelopment Plan* adopted in 2006 and the *Hunters Point Shipyard Redevelopment Plan* adopted in 1997.

Following certification of the EIR, the Redevelopment Plan Amendments will be considered by the Agency and by the Board of Supervisors. Adoption of the Redevelopment Plan Amendments would enable the Agency to (1) use redevelopment funds or financing mechanisms to remedy the blight that now characterizes the Project Areas; and (2) establish land use standards to allow and control development of the Project Areas.

In addition, adoption of the Project would include amendment of some components of the *San Francisco General Plan* to ensure consistency with the Redevelopment Plan Amendments; however, the General Plan contains a number of elements with most objectives, policies, and principles that are relevant to the Project that would not require any changes.

II.G.2 Disposition and Development Agreement

The DDA would allow and govern the physical construction of each element of the Project and establish and govern the relationship between the Agency and the Project Applicant regarding acquisition, ownership, assembly of a Project site, and financing, construction, ownership, and operation of Project improvements.

II.G.3 Design for Development

Design for Development documents (D4D) that would apply in each of the redevelopment plan areas would be among the implementing documents of the Redevelopment Plans. The Redevelopment Plan documents would set forth policies and principles for urban design within the Project site. The Redevelopment Plan documents would provide design standards, such as height, bulk, and density parameters that would apply to the Project.

The Redevelopment Plan documents would largely function as the *San Francisco Planning Code* for the Project site. Section II.G (Approval Requirements) provides additional information on Project implementation steps.

II.G.4 Project Plans

The following project plans will be approved and become binding at the time the Disposition and Development Agreement is approved:

Sustainability Plan. The Sustainability Plan details the goals and strategies that the Project will employ to achieve sustainability targets in seven focus areas that span the economic, social and environmental aspects of sustainability: economic vitality and affordability, community identity and cohesion, public well-being, safety and quality of life, accessibility and transportation, resource efficiency, ecology and advanced Information and communications technology.

Infrastructure Plan. The Infrastructure Plan includes grading plans for sea level rise, and plans for the low-pressure and high-pressure water distribution system, reclaimed water distribution, separated sanitary sewer collection, separated storm drain collection, low impact development strategies for stormwater management, and joint trench systems for electrical, communications and gas utilities.

Transportation Plan. The Transportation Plan describes the Project's Transportation Demand Management program (e.g., car pools, car sharing, transit passes, and "unbundled parking"), new and extended transit services, and on and off-site street network improvements.

Parks, Open Space, and Habitat Concept Plan. The Parks, Open Space, and Habitat Concept Plan describes the vision and guiding principles for Project parks, open space and habitat restoration. Included are descriptions of both passive and active recreational opportunities, an ecological program to restore native habitats, and cultural programming to highlight Shipyard's maritime heritage. Design guidelines for improvements including, trails, furnishings, and public art would also be included.

II.H TECHNICAL, ECONOMIC, AND ENVIRONMENTAL CHARACTERISTICS

The Project's technical characteristics are described in Section II.E (Project Characteristics). The site's environmental characteristics, including the environmental setting and anticipated environmental impacts, are described in Chapter III (Environmental Setting, Impacts, and Mitigation Measures). The Project would bring economic benefits to the City including an expanded economic base and additional sources of employment, as well as needed housing for all income levels. The Project would generate up to 10,730 employment positions. Approximately 3,476 new employees would be associated with Candlestick Point, and primarily with the regional retail uses. Approximately 7,254 new employees would be associated with HPS Phase II, and primarily with the R&D uses. The 350 jobs associated with the new 49ers stadium are mostly relocated from Candlestick Point to HPS Phase II.

In addition, construction employees would also be needed to construct the Project. The number of construction employees would vary depending upon the phase of construction, but would range from 83

workers at the commencement of construction activities to approximately 617 workers during2015, the most labor-intensive phases of construction. An additional discussion of the economic characteristics of the site is provided in Section III.C (Population, Employment, and Housing) and Section V (Growth Inducement, and Secondary Land Use Effects).

CHAPTER III Environmental Setting, Impacts, and Mitigation Measures

III.A INTRODUCTION TO ANALYSIS

Section III.B through Section III.S of Chapter III of this EIR contain a discussion of the potential environmental impacts of implementation of the Candlestick Point–Hunters Point Shipyard Phase II Development Plan Project, including information related to existing site conditions, analyses of the type and magnitude of Project-level and cumulative environmental impacts, and feasible mitigation measures that would reduce or avoid identified significant adverse environmental impacts.

III.A.1 Comments Received on the Notice of Preparation

During the 30-day public review period for the NOP, which began on August 31, 2007, and ended on September 29, 2007, comment letters were received from public agencies and individuals, as further discussed in Chapter I (Introduction) of this EIR. Additional comments were also received during the September 17, 2007, and September 25, 2007, scoping meetings. The NOP, the NOP comment letters, and scoping meeting minutes are included in Appendix A (Notice of Preparation and NOP Comments) of this EIR and were considered in the EIR analyses.

III.A.2 Scope of the EIR

The environmental analyses are presented in the following order:

- Land Use and Plans (Section III.B)
- Population, Housing, and Employment (Section III.C)
- Transportation and Circulation (Section III.D)
- Aesthetics (Section III.E)
- Shadows (Section III.F)
- Wind (Section III.G)
- Air Quality (Section III.H)
- Noise (Section III.I)
- Cultural and Paleontological Resources (Section III.J)
- Hazards and Hazardous Materials (Section III.K)
- Geology and Soils (Section III.L)
- Hydrology and Water Quality (Section III.M)
- Biological Resources (Section III.N)
- Public Services (Section III.O)
- Recreation (Section III.P)
- Utilities (Section III.Q)
- Energy (Section III.R)
- Greenhouse Gas Emissions (Section III.S)

All impacts associated with agricultural resources and mineral resources have been determined to be "Effects Not Found to Be Significant" according to Section 15128 of the CEQA Guidelines, and are briefly discussed in Chapter V (Other CEQA Issues) of this EIR.

III.A.3 Format of the Environmental Analysis

Each environmental topic in Section III.B through Section III.S of the EIR presents a project-level analysis of the Project's direct and indirect environmental impacts on the environment. Each section includes an introduction, a description of the environmental setting, the regulatory framework, Project- level impacts and proposed mitigation measures, and cumulative impacts. The impact sections include an analysis of the overall impacts of the Project, as well as an analysis of the Project impacts within the two geographically distinct portions of the Project (i.e., Candlestick Point and Hunters Point Shipyard Phase II). Construction and/or operation of shoreline improvements, the marina, Yosemite Slough bridge, or transportation improvements are typically discussed separately, unless there is a reason to discuss them with the Candlestick Point or Hunters Point Shipyard Phase II analyses.

The organization of each of Section III.B through Section III.S follows the outline below:

Introduction

The Introduction provides a brief description of the types of impacts that are analyzed in the section. For sections that are lengthy or analytically complex, an introductory overview of the format and structure of the section is presented.

Environmental Setting

As required by Section 15125(a) of the CEQA Guidelines, the Environmental Setting includes a description of the existing conditions at the Project site and/or in the vicinity of the Project site that provide the "baseline condition" against which Project-related impacts are compared. While the baseline condition is generally the physical conditions that existed at the time the NOP is published, which was August 2007, there may be reasons why a different baseline condition should be used for the analysis. For example, the baseline condition for transportation/traffic, air quality, and noise is the date(s) the traffic counts were taken, while the baseline condition for biological resources is the last date of the field surveys. Each section describes the baseline condition for that particular analysis.

Regulatory Framework

The regulatory framework provides a discussion of federal, state, and local regulations, plans, policies, and/or laws that are directly relevant to the environmental topic being analyzed.

Impacts and Mitigation

The impacts and mitigation discussion is divided into the following subsections, as described below.

Significance Criteria

The impact significance criteria used in this EIR are based on San Francisco Planning Department Major Environmental Analysis (MEA) and San Francisco Redevelopment Agency guidance regarding the environmental effects to be considered significant. This guidance is, in turn, based upon Appendix G to the CEQA Guidelines and MEA's Initial Study checklist, with some modifications. In cases where potential environmental issues associated with the Project are identified, but are not clearly addressed by the guidance listed above, additional impact significance criteria are presented. The significance criteria used for each environmental topic/resource are presented at the beginning of the impact discussion in each section of Chapter III of this EIR.

Analytic Method

This subsection identifies the methodology used to analyze potential environmental impacts for each environmental topic under the identified significance criteria. Some evaluations (such as for air quality, traffic, and noise) are quantitative, while others, such as for visual quality and urban design, are qualitative.

Construction and Operational Impacts and Mitigation Measures

This subsection describes the potential direct and/or indirect environmental impacts of the Project and, based on the significance criteria, determines the significance of each environmental impact. Project design features, such as green or sustainability features, that avoid or minimize adverse impacts on the environment are included as part of the Project analyzed in each impact discussion. As previously mentioned, the environmental impacts are described for the Project as a whole, and for the two geographically distinct portions of the Project (e.g., Candlestick Point or Hunters Point Shipyard). Where impacts could occur as a result of construction of the Yosemite Slough bridge, the marina, or the shoreline improvements, those impacts may be discussed separately. In some instances, the analyses for Candlestick Point and Hunters Point Shipyard Phase II are similar, and, therefore, are discussed together as the Project, and are not differentiated by area. (The section provided below, entitled "Analysis Format," provides a visual example of how the analysis is presented in the EIR.)

Each impact is summarized in an "impact statement" that is separately numbered, coincides with an identified significance criterion, and is followed by a detailed discussion. The impact statement also identifies the level of significance after implementation of all feasible mitigation measures. This format is designed to assist the reader in quickly identifying the subject and conclusion of the impact analyses.

The impact statements reflect whether the impact is caused by construction of the Project; implementation of the Project (meaning the conditions that would exist after the Project were constructed, which is generally related to the development pattern); or operation of the Project (reflecting conditions that would exist during actual operational activities, such as additional motor vehicle trips that would be generated by the Project). In a few instances, the impact statement is factual, such as "The Project would conform to the current regional air quality plan." In all cases, the impact statement reflects the condition that would result after the implementation of all of the identified mitigation measures.

A single criterion may have more than one "type" of impact that is analyzed. As an example, in Section III.N (Biological Resources), there is a significance criterion that relates to potential impacts to

sensitive species or habitats. Under that significance criterion, several types of impacts are analyzed in separate impact discussions, such as impacts to wetlands and impacts to individual sensitive species.

The geographic scope of the impact analyses varies depending upon the specific environmental issue being analyzed. Where the impact analysis identifies significant adverse environmental effects that could be reduced or avoided through implementation of a mitigation measure, the measure is presented after the relevant impact discussion. Mitigation measures identify specific and measurable actions that could be taken to reduce potentially significant environmental impacts.

Project impacts are also assessed in light of existing regulatory requirements that could serve to mitigate potential impacts. The effectiveness of existing regulations to mitigate potential impacts is often affected by discretionary requirements, site characteristics, and project features and design-level considerations that are not yet detailed. Because there is some discretion in how these regulations can be applied, for some impacts, these requirements are included as mitigation measures to outline the specific process by which the Project will comply with these regulations.

Mitigation measures identify the parties responsible for implementation, a timeframe for implementation, and any applicable public agency approval, oversight, or monitoring that may be required. Mitigation measures would usually be implemented by the Project Applicant, with oversight by one or more public agencies, unless indicated otherwise.

This subsection concludes with a statement regarding whether the impact, after implementation of the mitigation measures and/or compliance with existing local, State, and federal laws and regulations, would remain significant or be reduced to a less-than-significant level.

The Draft EIR uses the following terms to describe the level of significance of impacts identified during the course of the environmental analysis:

- **Significant Impact (S)**—A "significant effect" is defined by Section 15382 of the CEQA Guidelines as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment … [but] may be considered in determining whether the physical change is significant." As defined in this EIR, a significant impact exceeds the defined significance criteria and will result in significant and unavoidable impacts, either with or without feasible mitigation. If there are no feasible mitigation measures to reduce the impact, including compliance with existing local, State, and federal laws and regulations, it is considered significant and unavoidable (SU) at the conclusion of the analysis. If there are feasible mitigation measures to reduce the impact, including compliance with existing local, State, and federal laws and regulations, it is considered significant and unavoidable with mitigation (SU/M) at the conclusion of the analysis.
- **Potentially Significant Impact (PS)**—Impact that could exceed the defined significance criteria, but can be eliminated or reduced to a less-than-significant level through implementation of the identified mitigation measures.
- **Less-Than-Significant Impact (LTS)**—Impact that does not exceed the defined significance criteria or would be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations.

- **No Impact (NI)**—No adverse changes (or impacts) to the environment are expected.
- **Significant and Unavoidable Impact (SU)**—Impact that exceeds the defined significance criteria and cannot be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations and/or implementation of all feasible mitigation measures.
- **Significant and Unavoidable Impact with Mitigation (SU/M)**—Impact that exceeds the defined significance criteria and can be reduced through compliance with existing local, State, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.
- **Less-Than-Significant Impact with Mitigation (LTS/M)**—Impact that is reduced to a less-than-significant level through implementation of the identified mitigation measures.

- This EIR evaluates the direct, indirect, and cumulative impacts resulting from planning, construction, and operation of the Project, including impacts that occur on site or off site. Since publication of the Draft EIR, the development was revised to begin one to two years later, with the completion of building construction in 2031 (rather than 2029) and full occupancy by 2032. Appendices A1 through A5 provide substantiation that the change in phasing does not alter the conclusions of this EIR.

Analysis Format

The impact number and the subject matter of the analysis is first presented in a banner to clearly indicate what is being discussed. Following that, there are usually three impact statements and related impact discussions. Using the following example as a guide, the first one addresses Candlestick Point (i.e., Impact PH-2a), the second addresses HPS Phase II (i.e., Impact PH-2b), and the third addresses the impact of the Project (i.e., Impact PH-2), which is the combined impact of Candlestick Point and HPS Phase II. Where impacts could occur as a result of construction of the Yosemite Slough bridge, the marina, or the shoreline improvements, those impacts are usually discussed separately, resulting in four or more impact discussions, which would be numbered Impact PH-2c, Impact PH-2d, and Impact PH-2e, using the numbering sequence of the following example. In these cases, the impacts are still summarized with a combined impact of the Project. One exception to this general format is in Section III.N, where Project impacts are presented after the discussion of individual impacts at Candlestick Point and HPS Phase II. Project impacts begin with Impact BI-22 and conclude with Impact BI-26.

The following is an example of how the impact analysis is usually presented:

Impact PH-2: Population Growth

Impact of Candlestick Point

Impact PH-2a **Operation of the development at Candlestick Point would induce direct and indirect population growth, but this growth would not be considered substantial. (Less than Significant) *[Criterion C.a]***

Impact Discussion

Impact of Hunters Point Shipyard Phase II

Impact PH-2b **Operation of the development at HPS Phase II would induce direct and indirect population growth, but this growth would not be considered substantial. (Less than Significant) *[Criterion C.a]***

Impact Discussion

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact PH-2 **Operation of the Project would induce direct and indirect population growth, but this growth would not be considered substantial. (Less than Significant) *[Criterion C.a]***

Impact Discussion

As previously noted, in some instances, the analyses for Candlestick Point and Hunters Point Shipyard Phase II are similar, and, therefore, are discussed together as the Project; in these cases, the analysis is not differentiated by area. The following is an example of how the impact analysis is presented in these situations:

Impact AE-1: Effect on a Scenic Vista or Scenic Resources

Impact AE-1 **Construction activities associated with the Project would not have a substantial adverse effect on a scenic vista or scenic resources. (Less than Significant) *[Criteria E.a and E.b]***

Impact Discussion

Cumulative Impacts

CEQA requires that EIRs discuss a project's potential contributions to cumulative impacts, in addition to project-specific impacts. Section 15130(a)(1) of the CEQA Guidelines states that a "cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." Other projects include past, present, and reasonably probable future projects.

Section 15130(b)(1) of the CEQA Guidelines states that the approach to the cumulative impact analysis may be based on either of the following approaches, or a combination thereof:

- A list of past, present, and probable future projects producing related or cumulative impacts
- A summary of projections contained in an adopted general plan or related planning document designed to evaluate regional or areawide conditions

For the purposes of this EIR, the analysis of the potential for the Project's incremental effects to be cumulatively considerable is based upon a list of related projects identified by the City and neighboring jurisdictions and/or on full implementation of the City's General Plan and/or other planning documents, depending upon the specific impact being analyzed. For example, the cumulative analysis for the Traffic Study (which is the basis for many of the cumulative analyses in this document) uses the San Francisco

County Transportation Authority (SFCTA) travel demand forecasting model, which projects general background growth based on Association of Bay Area Governments (ABAG) projections and is consistent with buildout of the City's General Plan. The Traffic Study specifically updated the background growth assumptions based on information regarding a number of major related projects, including (Figure III.A-1 [Cumulative Development in the Project Vicinity]):

- India Baseline Shoreline
- Hunters Point Shipyard Phase I
- Hunters View
- Jamestown
- Executive Park
- Brisbane Baylands
- Cow Palace
- Visitacion Valley/Schlage Lock

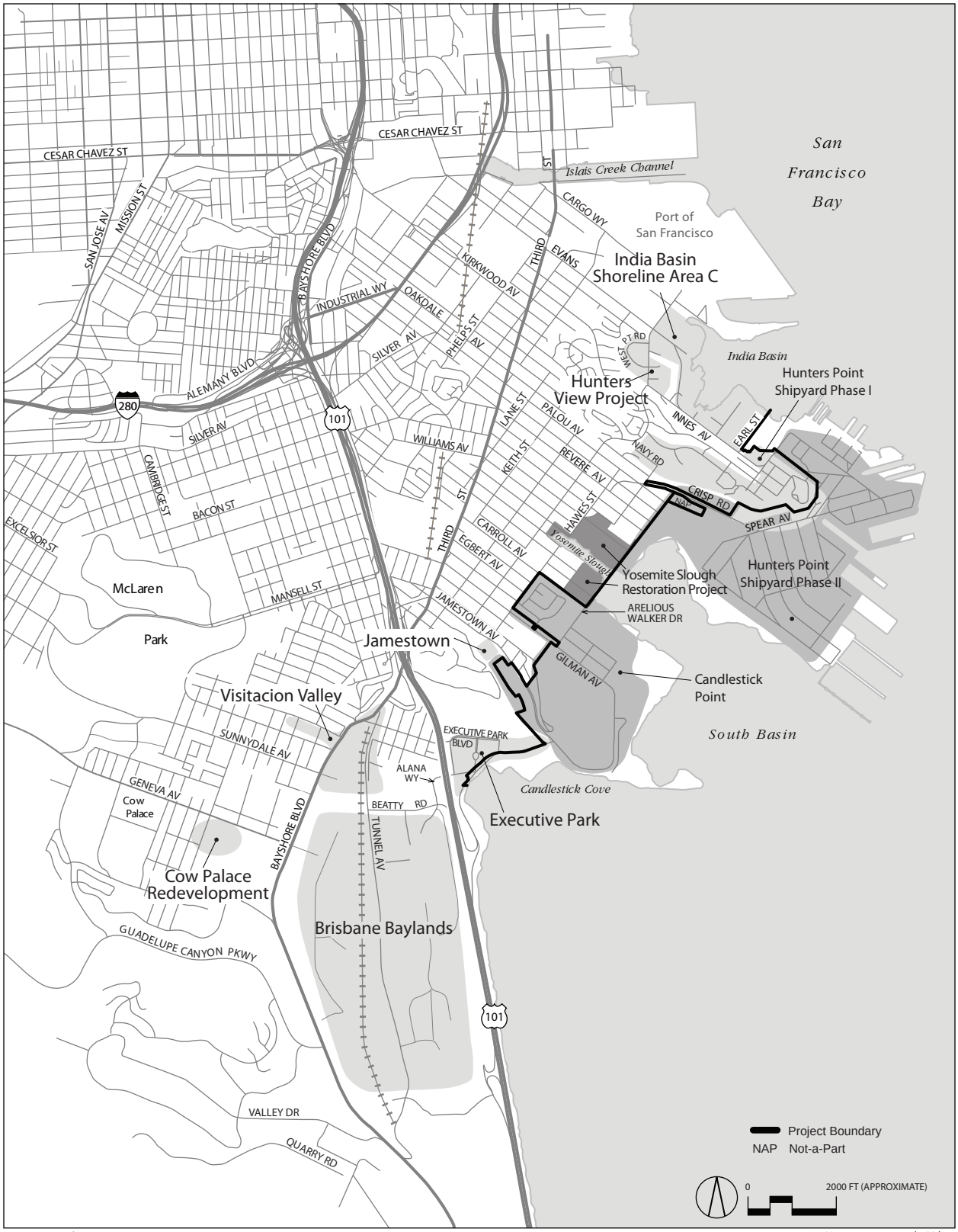
- A comprehensive list of all related projects included in background growth assumptions for the traffic, air quality, and noise analyses can be found in the Traffic Report, which is included as Appendix D (Transportation Study) to this EIR. For other issue areas, the Yosemite Slough Restoration Project was also included as a related project.

The geographic scope of the cumulative impact analyses and the specific related projects that are included in the analyses may also vary depending on the specific environmental issue being analyzed. Each technical section of this EIR designates the cumulative context for each cumulative impact analysis.

The EIR presents a cumulative impact analysis only where the Project's incremental effect would result in a less-than-significant, less-than-significant with mitigation, significant and unavoidable, or significant and unavoidable with mitigation, cumulative impact.

CEQA requires that an EIR discuss cumulative impacts to determine whether they are significant. If the cumulative impact is significant, the Project's incremental effects must be analyzed to determine if the Project's contribution to the cumulative impact is cumulatively considerable. In accordance with Section 15065(a)(3) of the CEQA Guidelines, this determination is based on an assessment of the Project's incremental effects viewed in combination with the effects of past, present, and probable future related projects. The existence of a currently existing significant cumulative impact does not necessarily mean that the Project's contribution to that impact must be significant. Instead, a Project's contribution to a significant cumulative impact is significant only if its contribution is cumulatively considerable.

CEQA recognizes that the analysis of cumulative impacts need not be as detailed as the analysis of project-level impacts, but instead should "be guided by the standards of practicality and reasonableness" (Section 15130(b) of the CEQA Guidelines). The discussion of cumulative impacts must reflect the severity of the impacts and the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the Project alone.



SOURCE: Fehr & Peers, AECOM, 2010.

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FIGURE III.A-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

CUMULATIVE DEVELOPMENT IN THE PROJECT VICINITY

SECTION III.B LAND USE AND PLANS

III.B.1 Introduction

In accordance with CEQA Guidelines Section 15125(d), this section provides a summary of the plans, policies, and regulations of the City and County of San Francisco, and regional, state, and federal agencies that have policy and regulatory control over the Candlestick Point - Hunters Point Shipyard Phase II Development Plan Project site. For informational purposes, this section also describes citywide planning initiatives and programs that continue to shape the Project's underlying goals and implementation strategies. Policy conflicts do not, in and of themselves, indicate a significant environmental effect within the meaning of CEQA. The *San Francisco General Plan* contains many policies that may address different goals. To the extent that physical environmental impacts may result from such conflicts, such impacts are analyzed in this EIR in specific topical sections such as Section III.I (Noise), Section III.H (Air Quality), and Section III.D (Transportation and Circulation). For example, policies that direct new development away from ecologically sensitive areas are discussed in Section III.N (Biological Resources), while policies that limit location of sensitive uses in areas with high noise and air emissions, are discussed in Section III.I, and Section III.H, respectively.

The majority of the Project site is within two Redevelopment Project Areas governed by the Hunters Point Shipyard Redevelopment Plan and the Bayview Hunters Point Redevelopment Plan. The Project's proposed amendments to the Redevelopment Plans would be reviewed by the Planning Commission for consistency with the General Plan and approved by the Agency Commission and the Board of Supervisors.

This section examines the potential for the Project to (1) physically divide an established community; (2) conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or (3) have a substantial adverse impact on the existing character of the vicinity. This analysis also addresses the consistency of the Project to the relevant land use plans, policies and regulations. Any potential conflict not identified in this environmental document would be considered in that context, and would not alter the physical environmental effects of the Project, which are analyzed in this EIR.

The potential for the Project to contribute to secondary land use effects, such as adverse effects on retail uses beyond the Project site, are discussed in Chapter V (Other CEQA Considerations). This section evaluates the potential for both project-level and cumulative environmental impacts.

III.B.2 Setting

■ Existing Land Use Context

Regional

The Project site is composed of Candlestick Point and HPS Phase II. Figure II-1 (Project Location) indicates the location of the Project within the City and County of San Francisco. As shown, the Project

site is on the southern waterfront in the southeastern portion of the City, approximately four miles south of the City's downtown. West of the Project site, major transportation corridors include United States Highway 101 (US-101), Interstate 280 (I-280), Third Street, and Bayshore Boulevard. The Caltrain corridor which travels between the Fourth and Townsend terminal and the Peninsula to the south runs in a north/south direction approximately one mile west of the Project vicinity (to the west of Third Street).

To the north are the City's Eastern Neighborhoods: the Mission District, Potrero Hill, the Central Waterfront, Showplace Square, and South of Market. Similar to the Bayview Hunters Point neighborhood, many of those neighborhoods include a mix of industrial, residential, and commercial uses. Figure III.B-1 (Existing Land Use) illustrates the land uses in the Project vicinity.

To the west of the Project site are US-101 and the Bernal Heights, Portola, Excelsior, and Visitacion Valley neighborhoods. Uses in these neighborhoods consist primarily of moderate density, single-family homes with some multi-family homes and neighborhood-serving commercial uses. Bayview Hill is a notable topographic feature that is located west of the Candlestick Point portion of the Project site. It contains open space area and creates a sense of separation between Candlestick and the neighborhoods to the west. Hunters Point Hill is also a notable topographic feature, and is located just west of the Hunters Point portion of the Project site, although it is smaller than Bayview Hill. Hunters Point Hill is primarily developed with multi-family residential uses with some institutional and social services.

To the south of the Project site, also west of US-101 and south of the City and County of San Francisco/San Mateo County line, are the cities of Brisbane and Daly City. Uses within these cities largely mirror neighboring residential uses in San Francisco. The area contains the Cow Palace exhibition hall and Sunset Scavenger waste collection and recycling center.

The City of Brisbane contains an industrial corridor, bounded on the west by Bayshore Boulevard and on the east by US-101. Brisbane Baylands is the site of a former sanitary landfill (that closed in 1967) and former railroad facilities. The landfill has continued in operation as a repository for clean fill materials from construction sites in the region and for recycling of sand, dirt, gravel, and other construction materials. Other uses in the Baylands include building supply businesses, lumberyards, the Kinder Morgan Energy tank farm, and the Bayshore Sanitary Sewer pump station. San Bruno Mountain State Park, immediately west and south of Brisbane, is a 2,326-acre park that encompasses San Bruno Mountain, the northernmost peak in the Santa Cruz Mountain Range.

Local

The Project site is part of the larger Bayview Hunters Point neighborhood, an area characterized by well-established residential neighborhoods, commercial uses, and industrial areas. Existing land uses in this neighborhood are described below by type of use: commercial/retail, civic and institutional, residential, industrial, and open space and recreation.

SOURCE: San Francisco Planning Department; PBS&J, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.B-1

EXISTING LAND USE

Commercial and retail uses are distributed throughout the neighborhood. Third Street, which includes neighborhood-serving retail shops and other commercial businesses, is the central north/south corridor through the community. This corridor includes a variety of shops, eating establishments, cleaners, beauty supply stores, hardware stores, groceries, and liquor stores. Bayview Plaza near Evans Avenue provides a cluster of retail uses, including a Walgreens, a copy shop, several restaurants, and offices. Along Bayshore Boulevard and in proximity to the I-280 and US-101 freeways in the northern part of the neighborhood are a number of auto-oriented retail uses, including large-scale commercial uses with off-street parking frontages, home improvement businesses, and fast food establishments.

A number of civic, institutional, religious, and social service uses are also centered on Third Street. Such uses include the Bayview Opera House and Plaza at Third and Oakdale, a central feature of the Bayview Hunters Point community; Bayview Hunters Point Multipurpose Senior Center; the Southeast Health Center; the Anna E. Waden Library; and the Southeast Community Facility, which houses a City College campus and a job training and career program and is a site for community meetings and civic events. Other institutional and social services, including the Bayview YMCA, are found on Hunters Point Hill.

Residential neighborhoods in the Bayview Hunters Point neighborhood are east and west of Third Street from US-101 to HPS. A majority of the existing residential uses are single-family units. However, there are older multi-family units distributed on the lower slopes of Bayview Hill and new multi-family units along Jamestown Avenue, Williams Avenue, and Innes Avenue. Mixed-use developments, including multi-family housing, are also being developed along the Third Street corridor. In addition, much of the residential development on Hunters Point Hill consists of multi-family housing units.

Industrial uses are found in the northern portion of the Bayview Hunters Point neighborhood, west and east of Third Street. This area includes many production, distribution, and repair (PDR) uses and mixed-use development. Immediately west of Third Street and south of the Islais Creek Channel, large industrial uses, such as regional moving and storage companies and wholesale distributors are intermingled with a range of small, local businesses, such as auto parts distributors and bulk mail assembly services. The San Francisco Produce District is in this area.

Light industrial and PDR uses occupy the South Basin industrial area surrounding Yosemite Slough, extending west to US-101. The South Basin industrial area contains a variety of small-scale industrial uses, such as auto repair shops, food distributors, bulk warehouses, and recycling facilities. The India Basin Industrial Park, to the northwest of India Basin and HPS and south of the Islais Creek Channel, includes a major distribution facility for the US Postal Service, light industrial, commercial service and multimedia businesses, and some retail businesses located at Bayview Plaza at the southeast corner of Third Street and Evans Avenue. Vacant parcels and buildings are distributed throughout all of the identified industrial areas.

Public open space is distributed throughout the neighborhood in public parks and open space and recreation areas along the Bay shoreline. Open space uses include the Islais Creek Promenade, Heron's Head Park, India Basin Shoreline Park, developed and undeveloped portions of the Candlestick Point State Recreation Area (CPSRA) around the eastern perimeter of Yosemite Slough, and Gilman Park on Gilman Avenue at Griffith Street. The San Francisco Recreation and Park Department owns the shoreline of "India Basin Flats" or Acosta Parcels (formerly known as the Ferrari Brothers property), a vacant property located near Earl and Innes Streets. The Bayview Playground and Martin Luther King Jr. Pool are on Third Street

between Armstrong and Carroll Avenues. Coleman Playground is on Mendell Avenue between Fairfax and Hudson Avenues. The Joseph Lee Recreation Center is on Drummond Avenue between Mendell and Lane Avenues. Bayview Park is west of Candlestick Point on Bayview Hill. Silver Terrace Playground is on Silver and Ledyard; and Palou-Phelps Open Space is on Palou. Open space on Hunters Point Hill includes Hilltop Park (currently undergoing reconstruction), Adam Rogers Park, Shoreview Park, and Innes Court Park and Hillpoint Park in HPS Phase I.

Project Site—Surrounding Uses

Candlestick Point

Land uses immediately surrounding Candlestick Point are varied. North of Carroll Avenue are light industrial uses such as metal fabrication and distribution facilities. West of Hawes Street and west and south of Candlestick Park, the predominant land use is single-family residential, with new multi-family residential units being constructed south of Jamestown Avenue, and townhomes, apartments, and condominium projects at Executive Park and other locations. At present, the existing development at Executive Park consists of three office buildings with associated parking and two residential buildings containing 128 units. Three other residential buildings, containing 176 units, are near completion. In addition, as of September 2009, nine residential buildings are under construction including a 107-unit building, as well as several other smaller townhouse buildings. Bayview Hill Park, a 19-acre natural habitat park, is west of Candlestick Park. To the east and south of the Candlestick Point site are the waters of the San Francisco Bay.

Hunters Point Shipyard Phase II

San Francisco Bay borders HPS Phase II on the south, east, and north. To the west, India Basin contains light industrial and some residential uses along Innes Avenue. The area adjacent to the HPS Phase II site to the southwest contains multi-family housing and single-family attached units. Milton Meyer Recreation Center, west of HPS Phase II, is a multi-purpose facility with game courts and an indoor gym used for afterschool programs, arts and crafts, indoor games, and other training activities. Uses in the area immediately surrounding the HPS Phase II site, such as industrial uses on Crisp Road, historically provided a buffer between the HPS Phase II site activities and nearby residential uses. Large setbacks and street blocks and a lack of pedestrian amenities were designed to discourage traffic near the HPS.

As discussed in Chapter II (Project Description), HPS Phase II is adjacent to HPS Phase I which is under construction. The HPS Phase II site surrounds the HPS Phase I development area, a 63-acre site, to the north, east, and south.

Project Site—Existing Uses

Candlestick Point

Candlestick Point consists of 281 acres generally bounded by Hawes Street to the northwest, Candlestick Cove and the San Francisco Bay to the south, Jamestown Avenue to the southwest, and South Basin to the east. The site includes residential uses, public open space, and the Candlestick Park stadium. Figure III.B-1 shows existing generalized land uses at the Project site and in the nearby vicinity.

The 256-unit Alice Griffith public housing site is bounded by Gilman Avenue on the south, Hawes Street on the west, Carroll Avenue on the north and Arelious Walker Drive on the east.

The most prominent land use in the Candlestick Point site is the Candlestick Park Stadium and associated parking areas, used by the San Francisco 49ers. Privately owned parking lots are adjacent to Candlestick Park parking lots. The vacant, undeveloped lots on Jamestown Avenue are used for overflow stadium parking. The San Francisco Candlestick RV Park, a private, 165-space RV site, fronts on Gilman Avenue west of the CPSRA. The remainder of the Candlestick Point site consists of the CPSRA. The entire CPSRA is 154 acres, and consists of approximately 120 acres within the Project site and 34 acres outside the Project site, near the Yosemite Slough area just west of Arelious Walker Drive and north of Carroll Avenue. Of the 120 acres of the CPSRA located within the Project boundary, about one-third have been developed for parkland uses. The developed land is mostly along the shoreline, and includes a network of paved and dirt paths, restrooms, picnic facilities, two fishing piers, paved lookout points, and an unused boat launch facility.

Access to most of the site is limited to an arterial loop road (Gilman Avenue/Jamestown Avenue/Bill Walsh Way/Ingerson Avenue) that encircles the Candlestick Park stadium and parking lot. Gilman Avenue and Hawes Street provide access to the Alice Griffith public housing complex. However, most non-arterial streets from the residential neighborhoods and industrial areas to the west of Candlestick Point reach a dead end before entering the site. Streets within the Alice Griffith public housing complex are internally oriented, and for the most part, do not connect to surrounding streets. In addition, Bayview Hill creates a physical barrier to the south, limiting access from this direction, except at Harney Way. The lack of street connectivity, combined with the site's large, barren parcels, lack of sidewalks, and low level of on-site activity, make Candlestick Point relatively unwelcoming to pedestrian traffic.

Hunters Point Shipyard Phase II

HPS Phase II, which is 421 acres, contains many structures associated with ship repair, storage and trucking, light manufacturing, construction storage and shops, laboratories, scrap metal recycling, administrative, and other former Navy uses dating largely from the World War II era.[41] Several former Navy buildings are currently leased and occupied as artist studios by approximately 300 tenant-artists; two buildings are leased for woodworking and picture framing. HPS Phase II also includes drydocks, piers and wharves, as well as repair berths. The entire HPS Phase II site is currently under the jurisdiction of the Navy.

Primary access to the southern portion of the site is provided by Crisp Road, Spear Avenue, and Fischer Avenue. Innes Avenue, Galvez Avenue, and Robinson Street provide access to the northern portion of the site. Historically, access to the site was controlled for safety and security reasons, and most of the site remains fenced off, prohibiting public access from surrounding neighborhoods. Like Candlestick Point, the HPS Phase II site lacks pedestrian amenities, such as sidewalks.

[41] City of San Francisco, *Hunters Point Shipyard Reuse Final EIR*, June 2000, p. 3-38.

Plans and Policies

Federal

Coastal Zone Management

The authority to evaluate projects conducted, funded, or permitted by the Federal government is granted to coastal states through the *Federal Coastal Zone Management Act* (CZMA) of 1972, 16 USC § 3501 et seq., as amended. Under the CZMA, any Federal projects or activities must be consistent to the maximum extent practicable with the provisions of federally approved state coastal plans, 16 USC 1456, CZMA § 307(c)(1). The coastal management plan for the east side of San Francisco consists of the McAteer-Petris Act, California *Public Resources Code* (PRC) Section 66600 et seq., the Bay Plan (Bay Conservation and Development Commission [BCDC], 1969, revised 1997), the Seaport Plan (BCDC and MTC, 1996), and local management programs. Under the approved coastal management program, 55 acres (22 ha) in the southeast portion of HPS are designated as a port priority use area in the Bay Area Seaport Plan, which is further described below.

For the Hunters Point Shipyard Reuse Plan, the Navy submitted a consistency determination to BCDC on January 12, 1999. The BCDC issued a Letter of Agreement for Consistency Determination Number CN1-99 on March 8, 1999. This letter is reproduced in Appendix B of the Final EIR for the Hunters Point Shipyard Reuse, February 8, 2000. Prior to HPS disposal, the Navy would obtain any further consistency determinations necessary for the amended Reuse Plan. Following HPS disposal, projects within BCDC's jurisdiction may require BCDC permits.

State

The Public Trust

The "public trust" is a legal doctrine that governs the use of tide and submerged lands, including former tide and submerged lands that have been filled. Public trust lands are required to be used for public trust purposes, which include navigation, fisheries, waterborne commerce, natural resource protection, and water-related uses that attract the public to use and enjoy the waterfront.[42] In addition, public trust lands generally may not be sold into private ownership. However, under limited circumstances, the California Legislature may authorize by statute the termination of the trust. Typically, this requires an exchange of lands, in which lands of equal or greater value and usefulness are added to the trust.

Upon statehood, California became owner of the tide and submerged lands within its boundaries by virtue of its sovereignty. Some of these lands were conveyed into private ownership prior to the enactment of a state constitutional prohibition on alienation of tidelands (Cal. Const., Art. X, Sec. 3). Other lands were granted, in trust, to the local jurisdictions in which they are located. The remainder are held by the state. Today, the California State Lands Commission holds title to all un-granted tide and submerged lands in California and monitors all grants by the California Legislature of tide and submerged lands to cities and counties.[43]

[42] California State Lands Commission, Public Trust Policy.
http://www.slc.ca.gov/Policy_Statements/Public_Trust/Public_Trust_Policy.pdf (accessed online July 23, 2009).
[43] California Public Resources Code, Division 6.

Most of the historic tide and submerged lands within San Francisco's city limits have been granted by the state, either to private parties or to the City and other public agencies. Courts have held that certain grants to private parties terminated the trust in the granted lands; other private grants, however, remain subject to a public trust easement, restricting the use of those lands. Lands granted to public entities such as the City are generally subject to the public trust, and are also subject to any additional terms and conditions provided in the granting statute (often called the "statutory trust"). In San Francisco, a number of grants of tidelands to the City were made over the years, the most substantial being the 1968 Burton Act, which granted all of the tide and submerged lands that were still held by the State at that time. The Burton Act did not include lands that were then in federal ownership, such as Hunters Point Shipyard. The State Lands Commission, in cooperation with the California Attorney General, monitors granted lands for compliance with the public trust and the applicable granting statutes.

Candlestick Point Public Trust Lands

Large parts of the Project area are filled tide and submerged lands. In the mid 1800s, many of those lands were conveyed into private ownership, filled, and freed of the trust. However, certain lands—primarily areas reserved as future streets and railroad rights-of-way—remained subject to the trust. In 1958 the Legislature authorized the sale of a portion of these lands to the City for the purposes of building the Candlestick Park stadium. The 1958 Act, Chapter 2 of the Statutes of the First Extraordinary Session (1958 Act) terminated the public trust on the transferred land, but required that these lands be used only for purposes of general statewide interest. Pursuant to the 1958 Act,[44] the City acquired the lands free of the trust and constructed the Candlestick Park stadium.

The remaining public trust lands within Candlestick Point were granted to the City pursuant to the Burton Act. Following the establishment of the CPSRA, the City conveyed the Burton Act lands within the park back to the State. Those lands are now held by the State Lands Commission and leased to the California Department of Parks and Recreation (CDPR). Outside the CPSRA, public trust lands continue to be held by the City, acting by and through the Port of San Francisco, under the Burton Act.

In 1998, Section 5006.8 of the California PRC was amended in connection with an earlier proposal for the replacement of Candlestick Park stadium. That statute authorized the Director of Parks and Recreation and the State Lands Commission (Commission) to enter into trust exchange and other agreements to convey to the City property held by the CDPR and the Commission to be used for permanent public parking for the Candlestick Park stadium replacement project.

Hunters Point Shipyard Phase II Public Trust Lands

The HPS site is also largely composed of former tide and submerged lands. Substantial portions of these lands were conveyed by the State into private ownership in the 1800s. In 1939, the Navy began acquiring lands for purposes of constructing and operating HPS, primarily through condemnation. This title history has given rise to substantial legal uncertainty as to the present status of the public trust on the HPS lands.

HPS was closed in 1974, and the federal Base Realignment and Closure Act subsequently authorized the Navy to convey the HPS lands to the City or to a local reuse authority approved by the City. The San

[44] Section 3 of Chapter 2 of the Statutes of California, 1958.

Francisco Redevelopment Agency is the approved local reuse authority for the shipyard. Pursuant to a 2004 conveyance agreement with the Agency, the Navy has conveyed a portion of the shipyard to the Agency and has agreed to transfer the remainder to the Agency following hazardous materials remediation.

In anticipation of this transfer, the *Hunters Point Shipyard Conversion Act of 2002* granted to the Agency, in trust, all of the State's right, title, and interest in the HPS lands upon their conveyance out of federal ownership.

The *Hunters Point Shipyard Public Trust Exchange Act* was enacted in 2003. It authorized and approved an exchange by the Agency of public trust lands within HPS when conveyed by the Navy, whereby trust lands that met specified criteria in this Act and that were not useful for public trust purposes could be freed from the public trust and conveyed into private ownership, provided that certain other lands that are not now public trust lands and that are useful for public trust purposes were made subject to the public trust through a land exchange. Any exchange under this Act requires the approval of the California State Lands Commission.

Senate Bill 792

Senate Bill 792 (SB 792) was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002,* the *Hunters Point Shipyard Public Trust Exchange Act*, and PRC Section 5006.8, and consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. These additional acres would widen the park at in an area where the CPSRA boundary currently runs very close to the shoreline, creating a very narrow "pinch point" in the park. The additional acreage would thus create a buffer between development and the shoreline and improve the recreational value of this section of the park. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres.

Project Consistency: The Project includes both trust consistent and trust inconsistent uses; they will be distributed consistent with the final Trust map approved in Senate Bill 792. A trust exchange agreement will be approved as part of the Project consistent with the final Trust map. Negotiations with the CSLC are ongoing.

California Department of Parks and Recreation (California State Parks)

Candlestick Point State Recreation Area General Plan

The California Park and Recreation Commission classified Candlestick Point as a State Recreation Area in April 1977.[45] The area is of statewide significance because it is the first unit of the California State Parks System developed with the goal of bringing California State Parks System values into an urban setting. The CPSRA site was comprised mostly of landfills around Candlestick Point and Yosemite Slough created during the 1940s in connection with the construction of HPS and adjacent industrial sites.

[45] Department of Parks and Recreation, *Candlestick Point State Recreation Area General Plan*, State Park and Recreation Commission Approval, November 1978, amended May 1987, March 1988.

As required by PRC Section 5002.2 and Section 4332 Title 14 of the *California Administration Code*, the *Candlestick Point State Recreation Area General Plan* (CPSRA General Plan) was approved by the California State Parks System in 1978 and amended in 1987.[46,47] The CPSRA General Plan provides general guidelines and identifies conceptual land uses, facilities, and park improvements within the CPSRA. The CPSRA General Plan addresses enhanced appreciation of the natural resources of the Bay, public access to the Bay shoreline, expanded visitor activities such as picnicking, camping, boating, hiking, bicycling, cultural resource and nature education, and public involvement of local residents in park planning and decision making. The 1987 amendments provided emphasis on windsurfing activity, and year-round access (including during football and baseball[48] seasons) for recreational users by new roads and ferry service.

The CDPR administers the CPSRA. The CPSRA comprises about 154 acres of improved and unimproved recreation and open space, including about 120 acres along the eastern and southern perimeter of Candlestick Point, and about 34 acres along the northern and southern perimeter of Yosemite Slough. Figure III.B-1 illustrates the existing CPSRA land within the Project site. The Yosemite Slough portion of the CPSRA is not part of the Project site.

The CPSRA General Plan includes a Resource Element that addresses cultural and historic resources, a Land Use Element, a Facilities Element, and an Operations Element. Conceptual land uses and facilities are shown on the CPSRA General Plan Land Use and Facilities map. The CPSRA General Plan also provides conceptual design guidelines. The CPSRA General Plan is still current and remains applicable until such time as it is amended. An amendment process is presently underway.

The Facilities Element lists the following types of recreational uses for the park: trails (hiking, jogging, and bicycling), group picnic areas, family picnic areas, group campgrounds, fishing piers, wind surfing facilities, a sand beach, a quiet area in the southeastern point, scenic overlooks, and a cultural program center. Maritime facilities proposed in the CPSRA General Plan include a non-powered boat/wind surfing rental facility; a boating center for boat classes and education; a boat access facility that includes a four-lane launching ramp; a

- 251-space parking area for car-boat trailers; a boat service station; and a ferry landing. A family dinner restaurant and family picnic rest stop are proposed for the Last Port area to the west of Hermit's Cove, off Harney Way.

The facilities and land uses called for in the current CPSRA General Plan have only been partly realized. Current uses in the park include hiking, limited bicycling, day use picnicking, group picnicking, jogging, nature viewing, three sand beaches, undeveloped windsurfing, two piers used by fishermen, and three

- restroom buildings. The park also includes a park staff/maintenance facility, 275 parking spaces for the developed portion of the park and a community garden. However, substantial portions (73 acres) of the park remain undeveloped (refer to Section III.P [Recreation]). Of this, approximately 40 acres of the park are used for parking for football games and other events at Candlestick Park.

The CPSRA General Plan identifies a list of uses that the community wished to develop. This was the extent of land planning as no definitive site plan was established. However, uses described in the CPSRA

[46] Department of Parks and Recreation, *Candlestick Point State Recreation Area General Plan*, State Park and Recreation Commission Approval, November 1978, amended May 1987, March 1988.
[47] Department of Parks and Recreation, *Candlestick Point State Recreation Area General Plan*, State Park and Recreation Commission Approval, November 1978, amended May 1987, March 1988.
[48] Baseball is no longer played at Candlestick Park stadium.

General Plan that have not been realized or developed include campgrounds, windsurfing or non-powered boating rental facilities, boating centers, motorized boat access facilities or four lane boat ramps, ferry landings, family restaurants or family group rest stops at Harney Way, or boat service centers. However, there is a boat trailer parking area that is not used for boating activities.[49]

The on-going CPSRA General Plan Amendment process would evaluate previously recommended uses and determine future uses and facilities to serve the local and statewide visitor to the park.

State Recreation Area Boundary Designation

Lands within the designated boundaries of CPSRA can only be used for state park purposes. As discussed above, SB 792 repealed former PRC Section 5006.8, which had authorized CDPR to transfer CPSRA lands out of the park as part of the previously proposed stadium replacement project. In its place, SB 792 authorizes an agreement between the CDPR and the City or the Agency to reconfigure the boundaries of the CPSRA, subject to a number of statutory conditions, including substantial conformance with a park boundary diagram set forth in the statute. In exchange for lands removed from CPSRA, the State must receive consideration in form of lands to be added to the park, the construction of new park improvements, and the provision of an ongoing source of funding for park operation and maintenance. The agreement must be approved by the Director of Parks and Recreation following adoption of written findings. Following approval of an agreement, the Director is authorized to revise the CPSRA boundaries to conform to the agreement. Table III.P-2 (Candlestick Point State Parks Land Exchange) and Figure III.P-2 (Proposed Parks and Open Space) present the proposed areas to be added to and removed from the park. The lands proposed to be removed from the CPSRA cannot be developed with non-park uses unless and until the Director has approved an agreement consistent with SB 792, and has modified the boundaries of the CPSRA accordingly.

Project Consistency: Consistent with the goals and objectives of the CPSRA General Plan, the Project would develop recreational resources, including parks, picnic areas, shade shelters, ; tidal marsh restoration; park ranger station/visitor's center, a meadow, a bio-filtration pond, and a restaurant/café at The Last Rubble; pedestrian pathways, upgraded restrooms, overlooks, an interpretive amphitheater, parking, and a windsurf/kayak launch at Heart of the Park, The Point, and The Neck; swimming, kayaking, and windsurfing at The Last Port. The Project also would connect the Bay Trail through the Project site resulting in 9.6 miles of continuous public access through a diversity of natural and historic environments. The Project's passive and active recreation areas that would be accessed along the Bay Trail would encourage a longer stay than walking or bicycling would occasion.

The Project proposes an agreement between the CDPR and the City or the Agency to reconfigure the boundaries of the CPSRA. Along with a reconfiguration of CPSRA, the Project includes improvements within the park, and the provision of an on-going source of park operation and maintenance funding. The proposed reconfiguration would remove 29.2 acres from the current boundaries of CPSRA to be used for urban development. 5.7 acres not currently included in the CPSRA would be added. In total, the area of the CPSRA would decrease at the Candlestick Point site from 120.2 to 96.7 acres. Table III.P-2 (Candlestick Point State Parks Land Agreement), in Section III.P, presents the proposed acreage of the

[49] Communication with Steve Bachman, California Department of Parks & Recreation, Senior Park & Recreation Specialist. September 16, 2009.

areas to be added, and removed, from the CPSRA. A more detailed discussion on the CPSRA reconfiguration and proposed uses is also provided in Section III.P.

The proposed reconfiguration of the CPSRA is consistent with the diagram set forth in SB 792. In addition, although there would be a decrease in the total area of the CPSRA, Project would result in an overall benefit to the CPSRA. Two-thirds of the park that is currently unused or underutilized, or that is used for Candlestick Park stadium parking would be substantially improved to enhance overall park aesthetics and landscape ecology; reconnect visitors to the Bay shoreline; and provide direct access to the Bay for swimming, fishing, kayaking, and windsurfing. Proposed improvements include shoreline restoration and stabilization, a bio-filtration pond to cleanse stormwater, the provision of habitat and opportunities for environmental education, 'Eco-Gardens,' and salt-marsh restoration (refer to Section III.P [Recreation]).

Pursuant to SB 792, no CPSRA General Plan amendment is required for the reconfiguration of the recreation area. However, before new facilities would be developed, a CPSRA General Plan amendment would be required to reflect the boundary changes and the proposed new uses that would be located on lands following the reconfiguration. The proposed improvements described in Draft EIR Section III.P (Recreation) will be reviewed by the CDPR as an option for the development of CPSRA. To the extent that the final improvements to the reconfigured CPSRA would be inconsistent with the CPSRA General Plan, these improvements would be addressed through the State Parks General Plan amendment process.

Regional

Bay Conservation and Development Commission

San Francisco Bay Plan

The *San Francisco Bay Plan* (Bay Plan) was prepared by the Bay Conservation and Development Commission (BCDC) from 1965 through 1969 in accordance with the *McAteer-Petris Act* (California *Government Code* Sections 66600–66682). It guides the protection and use of San Francisco Bay and its shoreline. Under the *McAteer-Petris Act*, BCDC has the authority to issue or deny permits for the placement of fill, extraction of materials, or substantial changes in use of land, water, or structures within its jurisdiction, and to enforce policies aimed at protecting the Bay and its shoreline.

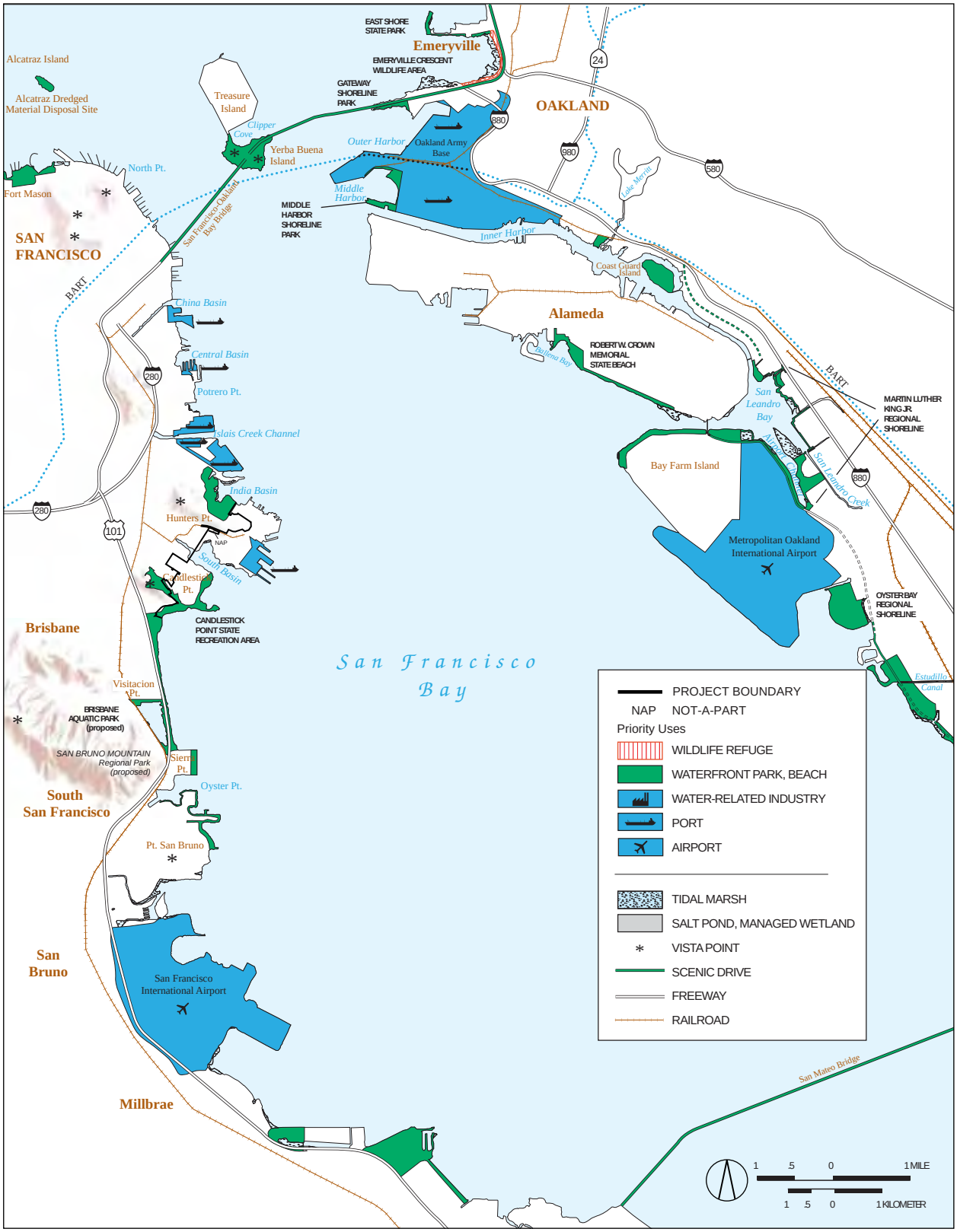
BCDC's permit authority over the Bay itself, which is below the mean high tide line, relates primarily to Bay fill, which can be approved by the Commission only for certain water-oriented uses or for improving shoreline appearance or public access to the Bay, and when there is no alternative upland location for the proposed use. In order for BCDC to approve a permit, the project must be consistent with the *McAteer-Petris Act* and the Bay Plan (including any Special Area Plan; refer to discussion below). BCDC's jurisdiction over the Bay shoreline is limited to a 100-foot-wide "shoreline band" extending inland from the mean high tide line and areas that are subject to tidal action from the south end of the Bay to the Golden Gate (Point Bonita-Point Lobos) and Sacramento River line. BCDC also has jurisdiction over other areas of the Bay not within the 100-foot shoreline band including salt ponds, managed wetlands, and certain waterways.[50]

[50] Certain waterways include all or portions of Plummer Creek in Alameda County, Coyote Creek in Alameda and Santa Clara Counties, Redwood Creek in San Mateo County, Tolay Creek in Sonoma County, Petaluma River in Marin and Sonoma Counties, and Napa River, Sonoma Creek and Corte Madera Creek in Marin County. Source: San Francisco Bay Plan.

To minimize future pressures for Bay fill, the Bay Plan Maps designate shoreline "Priority Use Areas" that should be reserved for regionally important, water-oriented uses needing or historically located on shoreline sites, such as ports, water-related industry, water-related recreation, airports, and wildlife refuges. The Bay Plan Maps also contain policies that generally specify uses and other criteria for the use and development of each designated site. The Project site is shown on Bay Plan Map 5, Central Bay.

Figure III.B-2 (San Francisco Bay Plan Land Use Designations) illustrates the San Francisco Bay Plan Land Use Designations for the Project site. The Plan maps are not intended to specifically delineate the Commission's jurisdiction to areas of the Bay. As shown on Figure III.B-2, the San Francisco Bay Plan Map 5 (Central Bay) designates a portion of the Hunters Point Shipyard area as a "Port" Priority Use Area, while a portion of the Candlestick Point area is designated as "Waterfront Park/Beach" Priority Use Area. The Bay Plan Map 5 notes indicate that CPDR and San Francisco are cooperatively developing plans for CPSRA improvements along the north shore of Candlestick Point and the Yosemite Slough area. Further, that San Francisco is planning to develop a large community park along the south shore of Hunters Point Naval Shipyard that would connect with CPSRA, coordinated with redevelopment of the stadium area and the shipyard. The Bay Plan Map 5 policies for CPSRA identify that some fill may be needed. The policies call for preserving the CPSRA for fishing, camping, picnicking, windsurfing, hiking, and viewing opportunities, as well as a potential water trail camping site. The Bay Plan Map 5 policies for South Basin identify that some fill may be needed in the inlet west of proposed freeway. Finally, for the Hunters Point area, the policies refer to the Seaport Plan and call for developing a shoreline park integrated with the CPSRA, consistent with the San Francisco redevelopment plan. Further there is the potential for a water trail camping site; and that some fill may be needed.

- The Bay Plan also includes design policies related to waterfront development so as to enhance the visual quality of development around the Bay. Design policies that are applicable to the proposed Project are set forth in Section III.E (Aesthetics). The proposed Project is a high-quality urban development that integrates substantial open space, pedestrian pathways, and shoreline improvements and would redevelop an underutilized, primarily vacant, or deteriorated site. The Bay Plan indicates that "uses such as parking lots and industrial structures, which neither visually complement the Bay nor take advantage of a waterfront location, should be phased out or upgraded by normal market forces." The Project has been designed to preserve view corridors. The Project would connect the existing street grid in an orientation that would allow an uninterrupted view toward the Bay from numerous area streets. Project towers have been situated in zones that would allow the provision of view corridors. Numerous open space areas and waterfront pedestrian pathways would provide expansive viewing opportunities as well. Buildings and structures have been designed to be complementary to the surroundings. Parking structures are not proposed for shoreline areas. The proposed bridge would be low in height and would connect two urban areas, relating to the adjacent developed and to-be-redeveloped land uses. The proposed bridge would provide unique viewing opportunities that are not currently available. The bridge would not substantially obstruct views of the Bay or affect the visual dominance of the hills around the Bay. The Project has been developed in conformance with the BCDC's Public Access Design Guidelines. Therefore, the Project would be consistent with the design policies of the Bay Plan.



SOURCE: San Francisco Bay Conservation and Development Commission.

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FIGURE III.B-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

SAN FRANCISCO BAY PLAN LAND USE DESIGNATIONS

Project Consistency: Bay Plan Map 5 (Central Bay) contained in the Bay Plan that pertains to the Project site, designates the Hunters Point area as "Port" Priority Use Area while a portion of the Candlestick Point area is designated as "Waterfront Park/Beach" Priority Use Area (Figure III.B-2). The relationship of the HPS Phase II portion of the Project to the "Port" Priority Use Area designation in the Bay Plan is discussed under the *San Francisco Bay Area Seaport Plan*. The Project proposes open space and recreational uses in the designated "Port" Priority Use area. The HPS Phase II component of the Project is compatible with the objectives and policies of the Bay Plan as a whole. The "Port" Priority Use designation is not a policy designed to reduce or avoid environmental impacts. Implementation of the Project would require an amendment to the Bay Plan because it proposes public and recreation uses that are different than the "Port" Priority Use Area designation.

The Project is consistent with the intent of the Bay Plan as it relates to the Candlestick Point area. The Project would provide park improvements, and on-going funding for park operation and maintenance. The ultimate configuration of improvements to various areas of the CPSRA would be determined by the CDPR but the Project would not preclude a water trail camping site or fishing, windsurfing, hiking and viewing opportunities. The inclusion of the Yosemite Slough bridge would not conflict with the Bay Plan's policy regarding additional bridges over the Bay, which aims to preserve the visual impact of the large expanse of the Bay. Expansive views of the Bay would remain from numerous vantage points, even with inclusion of the bridge over the neck of the slough.

The Project is also consistent with the Bay Plan policies to minimize Bay fill and to preserve the shoreline for uses that are regionally important, water-oriented uses needing or historically located on shoreline sites, such as ports, water-related industry, water-related recreation, airports, and wildlife refuges. The Project involves minimal filling associated with the Yosemite Slough bridge, a marina and improvement of the existing shoreline, waterfront bulkhead, piers and seawall structures. The Project includes improved access to the shoreline through shoreline improvements, open spaces and a waterfront promenade. Due to a proposed change in use for the HPS Phase II component of the Plan from the land use designation in the Bay Plan, the Project would require an amendment to the Bay Plan as a component of the entitlement action. Following such amendment, the Project would be consistent with the Bay Plan.

Bay Area Seaport Plan

The *San Francisco Bay Area Seaport Plan* (Seaport Plan) is a joint planning effort by BCDC and the Metropolitan Transportation Commission (MTC).[51] The Seaport Plan was adopted in 1996 and last amended in 2003. The Seaport Plan constitutes the maritime element of MTC's Regional Transportation Plan (refer to Section III.D), and is incorporated into BCDC's San Francisco Bay Plan, where it is the basis of the Bay Plan port policies. The Seaport Plan contains policies for future Bay Area maritime development, based on projected future needs for marine terminals. The shoreline areas designated in the Seaport Plan for Port of San Francisco use mirror the Port use designations in the Bay Plan.

The Seaport Plan assigns a "Port" use designation to an area within HPS Phase II. Bay Plan policies accompanying the Port use designation at Hunters Point state that 55 acres designated south of Manseau Street "should remain designated for port priority use and future development of two breakbulk

[51] Bay Conservation and Development Commission and Metropolitan Transportation Commission, *San Francisco Bay Area Seaport Plan*, April 1996 as amended through February 20, 2003.

berths."[52,53] Findings of the Seaport Plan note that the area most likely for marine terminal development includes Drydock 4, South Pier, the Re-gunning Pier, and the waterfront area along South Basin. However, the Port contracted CBRE Consulting and Martin Associates to update a 2001 study "Maritime Cargo Market and Warehouse Analysis."[54] The report identifies the Port of San Francisco as the only breakbulk facility in the Bay Area, annual cargo peaked in 2006 with 250,000 tons, and declined to 150,000 tons of cargo in 2007. Breakbulk at Pier 80 is primarily imported steel which is sensitive to the world economy. The report suggests that Pier 80 marketing efforts diversify from breakbulk into wind turbine components, autos, and fruit. The analysis suggests that the demand for breakbulk facilities is not greater than its current or projected availability. This indicates that policies for breakbulk cargo port priority uses for HPS Phase II may no longer reflect the current economic climate and realistic land use options.

Project Consistency: The Project is inconsistent with two policies that designate the Project site as having 55 acres remaining for port priority use and future development of two breakbulk berths.

The Project proposes a mixture of land uses on the HPS Phase II site that include a wide range of residential, retail, office, research and development, civic and community, and parks and recreational open space uses. A stadium and marina facilities are also proposed. However, port uses are not proposed for the Project. Findings of the Seaport Plan note that the area most likely for marine terminal development includes Drydock 4, South Pier, the Re-gunning Pier, and the waterfront area along South Basin. The Project's proposed marina is within this general location.

The Project would be inconsistent with the Seaport Plan, but not inconsistent with policies designed to reduce or avoid environmental impacts. Implementation of the Project would require an amendment to the Seaport Plan that references the Project site as a component of the entitlement action. Following amendment of the Seaport Plan, the Project would be consistent with the Seaport Plan.

Association of Bay Area Governments (ABAG)

ABAG is the comprehensive planning agency for the San Francisco Bay region. ABAG's mission is to strengthen cooperation and coordination among local governments. In doing so, ABAG addresses social, environmental, and economic issues that transcend local borders. ABAG has adopted the San Francisco Bay Trail Plan, which is discussed below, and is responsible for preparing the Regional Housing Allocation Plan and developing population and employment projections, both of which are further discussed in Section III.C (Population, Employment, and Housing).

San Francisco Bay Trail Plan

California Senate Bill 100 (SB 100) authorized the ABAG to "develop and adopt a plan ... for a continuous recreational corridor which will extend around the perimeter of San Francisco and San Pablo bays."[55] ABAG adopted the *San Francisco Bay Trail Plan* (Bay Trail Plan) in 1989 and administers it throughout the Bay region. The Bay Trail is a multipurpose recreational trail that, when complete, would encircle San

[52] *San Francisco Bay Area Seaport Plan*, p. 42, 1996.
[53] Break-bulk cargo is a shipping term for any loose material that must be loaded individually, not in shipping containers or in bulk as with oil or grain.
[54] CBRE Consulting and Martin Associates. "Maritime Cargo Market and Warehouse Analysis" February 2009.
[55] Association of Bay Area Governments (ABAG), *San Francisco Bay Trail Plan*, July 1989.

Francisco and San Pablo Bays with a continuous 400-mile network of bicycling and hiking trails. It would connect the shoreline of all nine Bay Area counties, link 47 cities, and cross the major bridges in the region. To date, approximately 290 miles of the alignment have been completed.[56]

The policies of the Bay Trail Plan emphasize siting and developing trails that: connect to existing park and recreation facilities; link to existing and proposed transportation systems; and avoid impacts on environmentally sensitive areas. Specific policies of the Plan address trail alignment, trail design, and environmental protection. Bay Trail Plan policies and design guidelines are intended to complement adopted regulations and guidelines of local jurisdictions and agencies.

The 2005 Gap Analysis Study prepared by ABAG, for the entire Bay Trail area, attempted to identify the remaining gaps in the Bay Trail system, classify the gaps by phase, county and benefit ranking, develop cost estimates for individual gap completion, identify strategies and actions to overcome gaps, and present an overall cost and timeframe for completion of the Bay Trail system.

Within the Project site, the 2005 Gap Analysis Study proposes to connect existing Bay Trail segments that are located north and south of the Project site by extending the trail along the waterfront of the Candlestick Point Recreation Area and through the Project site along HPS. The proposed trail would then connect to the existing trail north of the Project site along the India Basin shoreline.

The Gap Analysis Study also proposes an alternate, inland connection that is partially within the Project site, with the proposed trail traveling east along Gilman Avenue with the Project site, continuing north along Third Street that would ultimately connect to the existing waterfront portion of the trail near the India Basin via Yosemite Avenue/Carroll Avenue and Cargo Way.[57]

The Project would include the construction of the Bay Trail throughout the Project area, and support the proposed waterfront trail connection route within the Gap Analysis Study area, whereby the existing trail south of the Project area would ultimately connect to the existing northern trail along the India Basin shoreline. The Bay Trail would be accessible for pedestrians and bicyclists with connections to the existing and new parks, from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the CPSRA, Yosemite Slough, and HPS Phase II shoreline to India Basin. Refer to Figure III.B-3 (Existing San Francisco Bay Trail Plan Route).

Bay Trail policies and design guidelines are intended to complement, rather than supplant the adopted regulations and guidelines of local managing agencies. Policies that are applicable to the Project site related to trail alignment, rather than specific land use recommendations, are discussed within Section III.P of this EIR.

The land use objectives and policies of the Bay Plan that are relevant to the Project are contained in Part II (Objectives), Part IV (Development of the Bay and Shoreline: Findings and Policies), and within Part V: The Plan Maps. These policies and the associated consistency analysis related to the Project are listed and discussed in Table III.B-1 (Goals, Policies, and Objectives Analysis for Applicable Land Use Plans).

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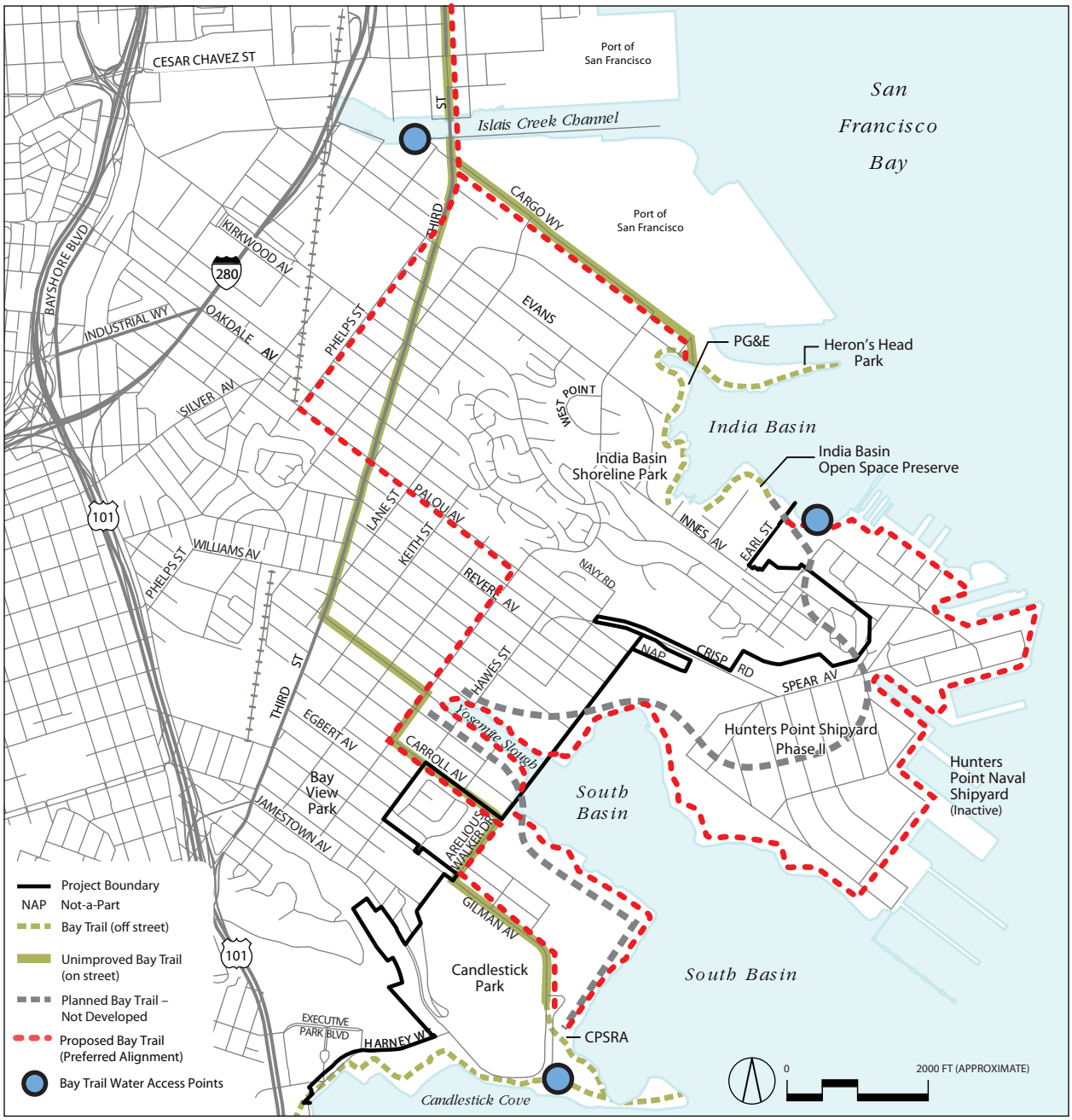
[56] Association of Bay Area Governments (ABAG), *San Francisco Bay Trail Overview*, 2008. http://www.abag.ca.gov/bayarea/baytrail/overview.html (accessed online August 2, 2009).
[57] ABAG, *Gap Analysis Study: A Report on Closing the Gaps in the 500-mile Regional Trail System Encircling San Francisco Bay*, 2005. http://www.abag.ca.gov/bayarea/baytrail/gap-analysis.html (accessed online August 2, 2009).



SOURCE: San Francisco Bay Trail Plan; PBS&J, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING SAN FRANCISCO BAY TRAIL PLAN ROUTE

FIGURE III.B-3

Project Consistency: The Bay Trail - San Francisco Peninsula Map illustrates the Bay Trail as an off-street path from Harney Way north around the CPSRA, and as a planned future trail around South Basin, Yosemite Slough, and through HPS. Refer to Figure III.B-3. As the Project site exists today, public access along the shoreline is not continuous, as the Bay Trail currently ends near Gilman Avenue within Candlestick Point and picks up again north of the Project site near India Basin. Much of the shoreline along the HPS property and portions of Candlestick Point are not accessible to the public.

As shown on Figure II-14 (Proposed Bicycle Routes), the Project would include the construction of the Bay Trail throughout the Project, and would ultimately connect to the existing trail along the India Basin shoreline. Trail improvements would include a pedestrian and bicycle trail along the shoreline with connections to the existing and new parks, from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the CPSRA, Yosemite Slough, and HPS Phase II shoreline to India Basin. The Bay Trail would be incorporated into the design of the parks facilities.

As shown on Figure III.B-3, the planned trail improvements for the Project site within the Bay Trail Plan around the northern portion of Candlestick Park and through the Hunters Point Phase II portions of the Project site are noted as "Planned Bay Trail—Future Route Not Developed." The Project would implement these planned changes by providing a continuous connection throughout the shoreline of the Project site. While the alignment of the Bay Trail within the Project site is not exactly as proposed in the Bay Trail Plan, it supports the aim of the Bay Trail Map, which is to provide a continuous link throughout the property and the Bay and provide additional links to park and recreational facilities. The Project not only supports this goal but it would also provide a pathway that is an improvement over the alignment indicated on the Bay Trail Plan; the Project proposes a Bay Trail alignment immediately adjacent to the shoreline as opposed to the slightly inland location within the HPS proposed on the Bay Trail Plan.

Overall, the Project is generally consistent with the Bay Trail Plan; however, it proposes an alignment for the Bay Trail that differs from the alignment reflected in the Bay Trail Plan. Implementation of the Project would require an amendment to the Bay Trail Plan to accommodate the new, improved alignment. Following such amendment, the Project would be consistent with the Bay Trail Plan.

Local

City of San Francisco General Plan

The *City of San Francisco General Plan* (General Plan), adopted by the Planning Commission and the Board of Supervisors, is both a strategic and long-term document, broad in scope and specific in nature. The General Plan is the embodiment of the City's collective vision for the future of San Francisco, and is comprised of a series of elements, each of which deal with a particular topic, that applies citywide. The General Plan contains the following elements: Air Quality, Arts, Commerce and Industry, Community Facilities, Community Safety, Environmental Protection, Housing, Recreation and Open Space, Transportation, and Urban Design. Objectives and Policies from these General Plan Elements are discussed in the respective Chapters of EIR that deal with the related topics. The San Francisco General Plan does not include a separate Land Use Element, rather, land use policies are dispersed throughout the other elements of the General Plan, as well as in the various Area Plans of the document.

The Area Plans identify specific localized goals and objectives for a neighborhood or district of the City, including the *Bayview Hunters Point Area Plan*. The Candlestick Point portion of the Project site currently within the BVHP Redevelopment Project Area is specifically addressed in the BVHP Area Plan. The BVHP Area Plan guides the future development of the Bayview Hunters Point district. The General Plan addresses land use at the Shipyard by reference to the HPS Redevelopment Plan.

Bayview Hunters Point Area Plan

The BVHP Area Plan is an adopted component of the *San Francisco General Plan* that serves as a guide to the future development of the BVHP community. This plan, based on many years of continued citizen input, seeks to provide guidelines for realizing BVHP's growth potential in a manner that is in the best interest of the local residents and the City as a whole. The BVHP Area Plan was updated in 2006 at the same time the BVHP Redevelopment Plan was revised to include Area B. The BVHP Area Plan includes sections on Land Use, Transportation, Housing, Industry, Urban Design, Recreation and Open Space, Community Facilities and Services, and Public Safety and Energy. Hunters Point Shipyard Phase II is generally not within the boundary of this Area Plan, though it is included in some of the BVHP Area Plan's objectives, policies, and discussions. The BVHP Area Plan was amended in 2006 during proceedings regarding the BHVP Redevelopment Plan.

Themes discussed throughout the BVHP Area Plan deal with the need to provide economic development and jobs, particularly for the local population; eliminating health and environmental hazards including reducing land use conflicts; providing additional housing, particularly affordable housing; providing additional recreation, open space, and public service facilities, and better addressing transportation deficiencies by offering a wider range of transportation options.

Project Consistency: The Project is consistent with the BVHP Area Plan in the following manner: New development would provide needed economic development both through construction jobs and approximately 10,730 permanent jobs (at both Candlestick Point and Hunters Point Shipyard Phase II) in a wide variety of fields and job types. The Project's programming would designate approximately 32 percent of the Project housing as below market rate for various income levels and housing types. Also as part of the affordable housing program, the existing Alice Griffith public housing would be reconstructed replacing the existing units one-to-one. The Project would offer a wide range of recreational and open space opportunities. The Project would change the boundary of the CPRSRA by removing approximately 29.2 acres and adding approximately 5.7 acres. The Project would also improve the CPSRA and provide funding for park maintenance.

Because the BVHP Area Plan was last updated in 2006, before the Project was initiated, discussions and figures dealing with Candlestick Point and its periphery don't reflect the land use programming reflected in this Project. Figure 4 of the BVHP Area Plan, "Generalized Land Use" designates properties within the Project site as "Candlestick Point Special Use District." Figure 5 of the BVHP Area Plan, "Candlestick Point Perimeter Proposed Revitalization Area," calls for stadium, commercial, parking, open space, and residential uses. With the exception of the stadium and the addition of a performance venue, the Project proposes uses that are consistent with this plan, including a mix of residential, retail, office, commercial, parks, and open space. However, the Project proposes a different development pattern that is consistent with the creation of an urban community.

Implementation of the Project includes amendments to the BVHP Area Plan, including amendments to most of the Plans' maps and minor text edits to ensure discussions of Candlestick Point are not out of date. A Sub-Area Plan of the BVHP Area Plan may also be created for Candlestick Point to further reflect the objectives and goals of this project for Candlestick Point.

The majority of the Project site is the Hunters Point Shipyard and the Bayview Hunters Point Redevelopment Project Areas. Both the Hunters Point Shipyard and Bayview Hunters Point Redevelopment Plans include land use designations to guide development. For areas within the Project site, but outside of the Redevelopment Project Areas, the General Plan provides the land use designations. The General Plan and the Redevelopment Plans are designed to be consistent with each other. The Redevelopment Plans, and consistency of the Project with the Redevelopment Plans, are further addressed below.

Proposition G

Proposition G, which is called the Bayview Jobs, Parks, and Housing Initiative (refer to Appendix B) was approved by San Francisco voters in June 2008. As discussed in this EIR in Chapter I (Introduction), and Chapter II, Proposition G encourages development of Candlestick Point and HPS with a mixed-use project including park and open space improvements, approximately 10,000 homes for sale or rent, about 700,000 gsf of retail uses, about 2,150,000 gsf of "green" office, science and technology, research and development, and industrial uses, an arena, and a site for a new San Francisco 49ers stadium.

Proposition G states that the Project should achieve the following objectives pertaining to population, housing, and employment:

- Create a range of job and economic development opportunities for local, economically disadvantaged individuals and business enterprises, particularly for residents and businesses located in the Bayview.
- Create substantial affordable housing, jobs, and commercial opportunities for existing Bayview residents and businesses.
- Include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and include the rebuilding of Alice Griffith Housing.
- Provide new affordable housing that is targeted to the lower income levels of the Bayview population, including new units that are suitable for families, seniors, and young adults.
- Include housing at levels dense enough to create a distinctive urban form and at levels sufficient to make the Project financially viable; attract and sustain neighborhood retail services and cultural amenities; create an appealing walkable urban environment served by transit; help pay for transportation and other infrastructure improvements; and achieve economic and public benefits for the Bayview in particular and the City generally.
- Upon consultation with Alice Griffith Housing residents and the receipt of all required governmental approvals, rebuild Alice Griffith Housing to provide one-for-one replacement units targeted to the same income levels as those of the existing residents and ensure that eligible Alice Griffith Housing residents have the opportunity to move to the new, upgraded units directly from their existing Alice Griffith Housing units without having to relocate to any other area.
- Include a mix of stacked flats, attached town homes and—in appropriately selected locations—low-rise, mid-rise and high-rise towers, to help ensure the economic feasibility of the development and provide a varied urban form.

Proposition G also permits the sale, conveyance, or lease for non-recreational purposes of any of the parkland that is under the jurisdiction of the San Francisco Recreation and Parks Commission and located within the boundary of Candlestick Point, including the property currently used in connection with the existing stadium and related parking areas. In addition, Proposition G allowed the construction, maintenance, and use for non-recreational purposes of any structure on such property. Proposition G repealed Propositions D and F. Proposition G proposed that new zoning be established along with a land use program for Candlestick Point and HPS. The Project would be consistent with Proposition G and proposes to amend the existing zoning to be consistent with Proposition G.

San Francisco Redevelopment Plans

The Agency has adopted two redevelopment plans for the Bayview Hunters Point area. The Agency exercises planning and regulatory control over designated redevelopment areas through adoption and implementation of redevelopment plans. The *Bayview Hunters Point Redevelopment Plan* currently governs development in the Candlestick Point portion of the Project site, while the existing *Hunters Point Shipyard Redevelopment Plan* governs the HPS Phase II portion of the Project site.

Bayview Hunters Point Redevelopment Plan (formerly the Hunters Point Redevelopment Plan)

The San Francisco Board of Supervisors adopted the BVHP Redevelopment Plan in 2006. (Refer to Chapter I for history of the planning efforts leading to adoption of this Plan.) The BVHP Redevelopment Plan is an amendment of the *Hunters Point Redevelopment Plan*, established in 1969.

In 1997, Agency staff began working with the Bayview Hunters Point Project Area Committee (PAC) on the development of the *Bayview Hunters Point Community Revitalization Concept Plan* (Concept Plan). In November 2000, the PAC approved the Concept Plan, which serves as a vision statement for the community to guide the redevelopment planning process. The Concept Plan contains goals and objectives for revitalization of the area. This planning effort led to the 2006 amendment of the *Hunters Point Redevelopment Plan* and BVHP Redevelopment Plan.

This amendment renamed the plan the *Bayview Hunters Point Redevelopment Plan* (refer to Figure III.B-4 [Bayview Hunters Point Redevelopment Plan Land Use Designations]). The primary redevelopment programs of the BVHP Redevelopment Plan include an Economic Development Program, Affordable Housing Program, and a Community Enhancements Program.

The land use designations within the BVHP Redevelopment Plan applicable to the Project are described below.

- **Residential.** Permitted uses are residential land uses ranging from single-family homes to multi-family developments of a moderate scale. Compatible related uses are also permitted such as local-serving businesses, family childcare facilities, small professional offices, home occupations, and recreation facilities.
- **Stadium/Mall Special Use District.** Land uses permitted in this District consist of a stadium use and a proposed mall pursuant to Proposition F passed by the voters in 1997. The land uses permitted in this District were designed to be consistent with the now repealed Proposition F, which provided for a stadium/mall.

SOURCE: Bayview Hunters Point Redevelopment Plan, PBS&J, 2009.

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FIGURE III.B-4

BAYVIEW HUNTERS POINT REDEVELOPMENT PLAN LAND USE DESIGNATIONS

Due to the large size and the diversity of Bayview Hunters Point, the BVHP Redevelopment Project Area is divided into seven Economic Development Activity Nodes. Land within the Project site is within the Candlestick Point and South Basin Activity Nodes.

Policies contained in the BVHP Redevelopment Plan for these Activity Nodes that are relevant to the Project site are listed below.

Candlestick Point Activity Node

The Candlestick Point portion of the Project site is within the Candlestick Point Activity Node.

- Assist with the development of a new San Francisco 49ers football stadium and commercial project consistent with Propositions D and F, approved by San Francisco voters on June 3, 1997.
- Create community and regional destinations and gathering places—including a restored and redeveloped Yosemite Slough on CPSRA land.

The Project would include cultural facilities such as community facilities, parks and a performance venue/arena that would be used for performing arts, dance, sporting events, and music. These facilities would complement the existing cultural resources in the surrounding area.

The Project proposes to construct a new Yosemite Slough bridge for automobiles, pedestrians, and bicyclists that would connect Candlestick Point to HPS. Although the construction of the Yosemite Slough bridge would change this area, it would not detract from its use in the CPSRA or its biological and other resource utility (refer to Section III.P and Section III.N).

South Basin Activity Node

The portion of the Project in the South Basin Activity Node Designation is the Alice Griffith housing site, which is designated for residential use. The Project would redevelop the Alice Griffith site and include one-for-one replacement of the 256 public housing units.

Policies relevant to the Project site are listed below.

- Promote transit-oriented development adjacent to Third Street, with residential units, including affordable housing units, in appropriate locations.
- Encourage the development of industrial and large-scale commercial space on properties zoned for light industrial uses.
- Create buffer land use zones between residential and industrial uses to minimize potential adverse environmental health impacts and other land use conflicts.
- Promote locally owned businesses and local entrepreneurs.
- Promote retail growth focused on neighborhood-serving businesses that meet the basic shopping needs of the community.
- An eco-industrial park in the southeast portion of the district, with defined truck routes linking the Shipyard and the freeway.
- Protect historic residential neighborhoods, with a range of new infill housing and transit-oriented mixed-use development focused around light rail stations.
- Renovate Housing Authority projects.

Project Consistency: The Project is generally consistent with the BVHP Redevelopment Plan. The proposed residential land use for the Alice Griffith district within the Project site would be consistent with the residential land use category within the BVHP Redevelopment Plan.

The BVHP Redevelopment Plan's use designations for other sections of Candlestick Point reflect Proposition D and Proposition F (approved by the voters in 1997) intentions, which were to provide for the development of a new state-of-the-art stadium for the San Francisco 49ers football team and an entertainment/retail shopping center at Candlestick Point that includes open space areas. However, since 2006 when the BVHP Redevelopment Plan was adopted, Proposition G was passed and the San Francisco 49ers have indicated that the stadium at Candlestick Point did not meet their needs. The mix of land uses proposed for Candlestick Point under the Project would include a mix of residential, retail, office, commercial, parks, open space, and a performance venue. It would not be consistent with the use designations in the BVHP Redevelopment Plan, which call for a stadium/mall development. In May 2007, the Redevelopment Commission, Board of Supervisors, and the Mayor endorsed a Conceptual Framework for the integrated planning and development of the Project, with a potential stadium site located at HPS. The Project reflects the changes in economic and political climate that have occurred since adoption of the BVHP Redevelopment Plan.

The Project includes amendments to the existing BVHP Redevelopment Plan to change the land use designation for Stadium/Mall Special Use District and associated descriptions under the Candlestick Park Activity node. The amendments would be consistent with the proposed development.

Hunters Point Shipyard Redevelopment Plan

In July 1997, the Board of Supervisors, by Ordinance No. 285-97, adopted the HPS Redevelopment Plan for the revitalization of HPS.[58] (Refer to Chapter I for a detailed discussion of the Disposition and Development Agreement and additional history of the HPS planning process.)

The HPS Redevelopment Plan contemplates development of a range of uses under the broad categories of industrial, research and development, mixed use, cultural and educational, residential, and open space. The HPS Redevelopment Plan divides the shipyard into five development parcels, Parcels A through E. Parcel F, which comprises approximately 440 acres of submerged land in the Bay was not proposed for development in the HPS Redevelopment Plan.[59,60]

Phase I development of the shipyard is currently underway on Parcel A-Prime. It includes approximately 1,600 residential units and neighborhood retail and community serving uses on 75 acres. The Phase I

[58] San Francisco Redevelopment Agency, *Redevelopment Plan for the Hunters Point Shipyard Redevelopment Project*, July 14, 1997.
[59] In 1992, the HPS was divided into six separate parcels, known as Parcels A, B, C, D, E, and F. These parcels correspond to the Navy's plan to phase remediation of hazardous materials on the HPS on a parcel-by-parcel basis.
[60] In accordance with procedures for transfer of Navy property, the Agency accepted title to Parcel A-Prime in December 2004. In April 2005, the Agency transferred the portions of Parcel A-Prime to be privately developed to Lennar Urban to construct the infrastructure improvements required under the Phase I DDA. Subsequently, the transfer of Parcel B-Prime from the Navy to the Agency was delayed. As a result, on October 17, 2006, the Agency Commission approved an amendment to the Phase I DDA to remove Parcel B-Prime from the Phase 1 development and to shift the entitled residential units from Parcel B-Prime to Parcel A-Prime. The revised Design for Development standards for Parcel A-Prime address dwelling unit density standards, height and bulk limits, off-street loading, lot sizes, street design, and other similar topics.

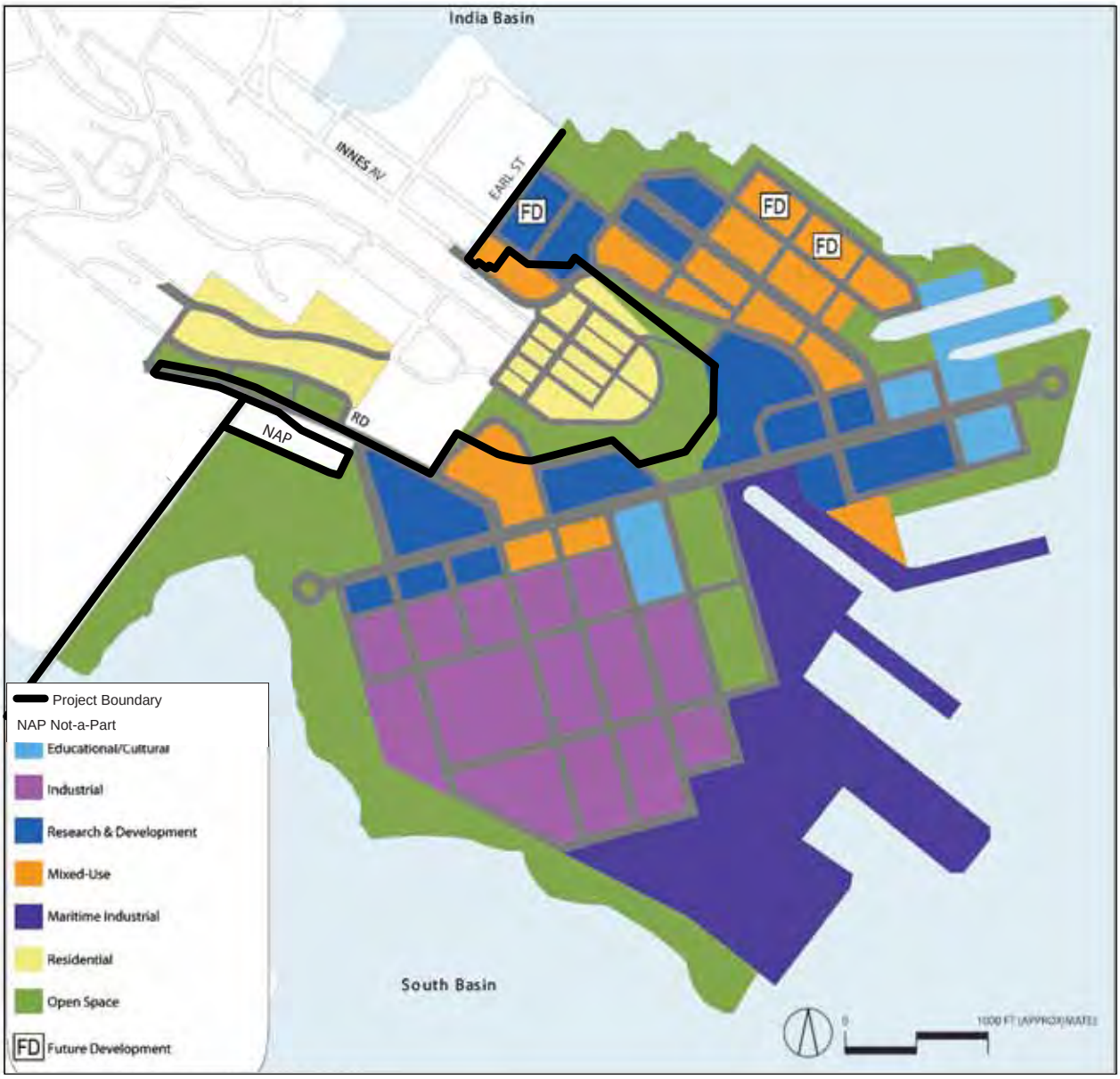
development is not part of the Project (refer to Figure III.B-5 [Hunters Point Shipyard Redevelopment Plan Land Use Designations]).

The HPS Redevelopment Plan includes the following Land Use Designations relating to the HPS Phase II site.

- **Industrial**—Light industrial including the following similar uses: manufacturing, processing, assembly of products, trucking, wholesale, printing and publishing, auto-related services, motion picture production, warehousing and distribution, and artist and artisan studios.
- **Research and Development**—Firms engaged in the manufacture, processing, or assembly of products including surgical and medical appliances and supplies, diagnostic substances, electronic equipment and instruments, data processing and telecommunication services, artists/artisan studios, and live-work spaces.
- **Mixed Use**—Artist's studios and live work spaces, residential, galleries, recording studios, business and arts services, real estate and insurance offices, hotels and conference facilities, and local-serving retail sales.
- **Cultural and Educational**—Education and training facilities, museums, theatres, specialty retail, restaurants, galleries, conference facilities, and artist's studios.
- **Residential**—Mixed income housing, single- and multi-family residential development of approximately 800 to 1,300 dwelling units.
- **Open Space**—Active and passive recreation, plazas and promenades, wetland restoration, and ancillary commercial uses.
- **Maritime Industrial**—Shipping terminals and berths, cargo and equipment warehouses, ship repair, maritime training facilities, and similar maritime related industrial uses.

The land uses that are proposed in the Project for HPS Phase II are discussed below.

- **Residential**—The Project provides for residential areas that would accommodate up to 2,650 residential units, but would eliminate the HPS Redevelopment Plan live-work designation. The areas designated for residential use would also allow neighborhood retail and community facilities. The Project would allow residential uses in areas where the HPS Redevelopment Plan provides for mixed-use and research and development.
- **Neighborhood Retail**—The Project provides for 125,000 gsf of neighborhood retail uses. In addition, the area designated for neighborhood retail use would allow for community facilities, residential, and up to 255,000 gsf of artist studios and Artist Education Center. Neighborhood retail designation would be located in areas where the HPS Redevelopment Plan provides for mixed-use and research and development.
- **Research and Development**—The Project provides for up to 2,500,000 gsf of research and development uses defined to include office, laboratory uses, and light industrial. Areas designated for research and development would also allow community facilities, neighborhood retail, artist studios, and the artist education center. The research and development designation would be located in areas where the HPS Redevelopment Plan provides for cultural and educational, research and development, mixed-use, and open space.
- **Community Facilities**—The Project provides for up to 50,000 gsf of community services and facilities. The community facilities designation would be located in areas the HPS Redevelopment Plan designates for open space and research and development.



SOURCE: Hunters Point Shipyard Redevelopment Plan, PBS&J, 2009.

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FIGURE III.B-5

HUNTERS POINT SHIPYARD REDEVELOPMENT PLAN LAND USE DESIGNATIONS

- **Parks and Open Space**—The Project includes 231.6 acres of open space and parklands in HPS Phase II. The parks and open space designation would be located in areas that the HPS Redevelopment Plan designates for parks and open space, maritime industrial, industrial, mixed use, research and development, and cultural and educational.
- **Football Stadium**—The Project includes a 69,000-seat football stadium. The football stadium designation would be located in areas the HPS Redevelopment Plan designates for cultural and educational, open space, mixed use, and industrial.

Project Consistency: The HPS Redevelopment Plan included provisions for each general land use type proposed for the Project site except the stadium, but in a different development pattern, as illustrated by Figure III.B-5 and Figure III.B-6 (Proposed Land Use Plan). Maritime industrial uses that are designated in the HPS Redevelopment Plan are not provided for as part of the Project. Unlike the HPS Redevelopment Plan, the Project would identify the maximum allowable square footage of development permitted for each category. The development standards in the HPS Redevelopment Plan were limited to height restrictions, the number of buildings that could be constructed, and the number of residential units.

The Project provides for a total of 2,650 residential units; the HPS Redevelopment Plan provided for approximately 800 to 1,300 residential units, plus additional live-work units.

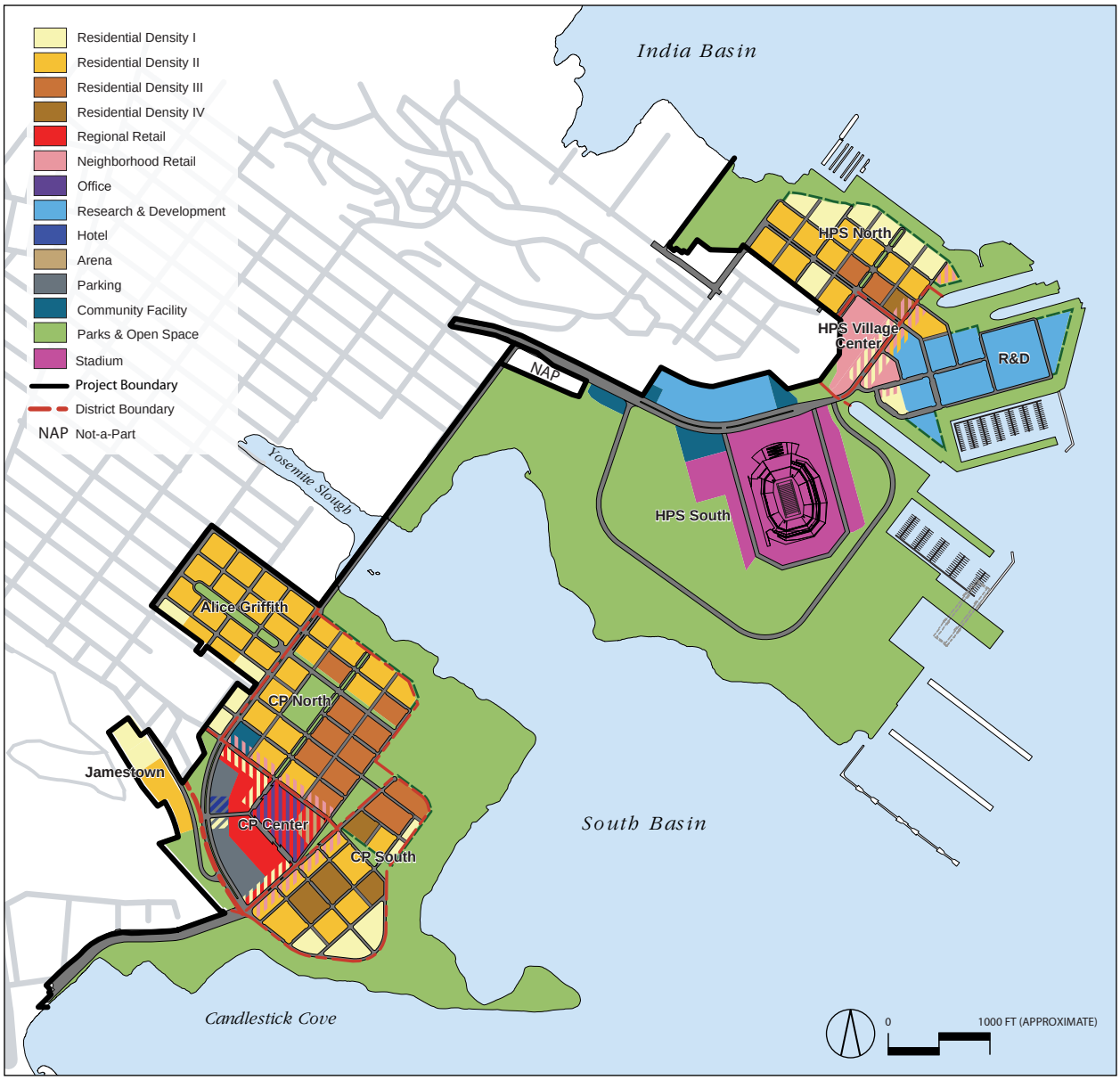
As discussed under Impact LU-2, the Project is consistent with the policies contained in the HPS Redevelopment Plan. The Project is not consistent with some of the Land Use Designations for the HPS Phase II site and standards and intensity of uses identified within the HPS Redevelopment Plan. The Project includes amendments to the existing HPS Redevelopment Plan, which would be consistent with the proposal development.

San Francisco Planning Code

The *San Francisco Planning Code* regulates development in the City by prescribing the permitted uses and development standards consistent with the land use designation and policies in the San Francisco General Plan.

Zoning in San Francisco generally consists of two layers of districts. Use Districts are the base zoning districts that prescribe which land uses are permitted and most development standards (except height and bulk). Height and Bulk Districts are mapped separately from the Use District and prescribe the height and bulk of buildings. On top of the Use Districts and Height and Bulk District, Special Use Districts (SUDs) are mapped in some instances to address particular issues for targeted areas; SUDs provide controls that supersede some or all of the underlying Use District to meet certain goals.

The current zoning of the Candlestick Point portion of the Project site is mostly Public (P), which permits public uses and facilities. The P Zoning at Candlestick Point includes most of CPSRA, Candlestick Park stadium and its parking areas. Alice Griffith is zoned RM-1 (Residential, Mixed – Low Density). This district accommodates a mix of residential housing types (i.e., houses and apartments) at a density ratio of one unit for every 800 square feet of lot area. The area bordered by Arelious Walker, Egbert Avenue, Donahue Street, and Gilman Avenue is largely zoned M-1 (Light Industrial), which allows a wide range of uses. Some outlying portions of the CPSRA have remnant zoning of RH-1(D) (Residential, House, Single-Family detached) and M-2 (Heavy Industrial). The San Francisco Zoning Maps refer to the Hunters Point Shipyard Redevelopment Plan for the Use Districts for Hunters Point Shipyard.



SOURCE: Lennar Urban, 2009.

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FIGURE III.B-6 Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED LAND USE PLAN

There are two portions of the Project site that are outside of the BVHP Redevelopment Project Area and HPS Redevelopment Project Area. One portion bordering Harney Way is currently zoned P to the south of Harney Way (and within the CPSRA) and C-2 to the north of Harney Way. Harney Way is proposed to be widened in this location, which would change the use of a portion of the CPSRA and the C-2 designated area. The other portion is south of Crisp Road and north of the end of Arelious Walker Drive and it is zoned M-2 and P. The Project proposes to connect Arelious Walker Drive to Crisp Road in this area.

While there are currently no Special Use Districts designated in either area, Candlestick Point recently included a Candlestick Point Special Use District. The SUD was put in place by Proposition F in 1997 to specifically accommodate a new football stadium and retail and entertainment development. As discussed above under Proposition G, the voters removed the SUD as a part of the measure, with the expectation that new zoning would be created to accommodate the program described therein and which is the Project analyzed in this EIR.

In November 1986, the voters of San Francisco approved Proposition M, the Accountable Planning Initiative, which added Section 101.1 to the City *Planning Code* to establish eight Priority Policies. These policies, and the sections of this Environmental Evaluation addressing the environmental issues associated with the policies are (1) preservation and enhancement of neighborhood-serving retail uses (Section III.B); (2) protection of neighborhood character (Section III.B); (3) preservation and enhancement of affordable housing (Section III.C with regard to housing supply and displacement issues); (4) discouragement of commuter automobiles (Section III.D); (5) protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership (Section III.B); (6) maximization of earthquake preparedness (Section III.L [Geology and Soils]); (7) landmark and historic building preservation (Section III.J [Cultural Resources and Paleontological Resources]); and (8) protection of open space (Section III.F [Shadows] and Section III.P).

Prior to issuing a permit for any project that requires an Initial Study under CEQA, and prior to issuing a permit for any demolition, conversion, or change of use, and prior to taking any action that requires a finding of consistency with the General Plan, Section 101.1 requires that the City find that the proposed project or legislation would be consistent with the Priority Policies. As noted above, the consistency of the Project with the environmental topics associated with the Priority Policies is discussed in Chapter III (Environmental Setting, Impacts, and Mitigation Measures) of this EIR. The case report and approval motions for the Project would contain the Planning Department's comprehensive Project analysis and findings regarding consistency of the Project with the Priority Policies.

Project Consistency: The Project is not consistent with the existing zoning at Candlestick Point as it would not accommodate high-density residential, retail and office uses at the locations contemplated. The proposed reconfiguration of the CPSRA does not match the existing boundary of the "P" Districts at Candlestick Point. As noted above, Hunters Point Shipyard does not have any zoning under the *Planning Code*. As part of the Project, a new Special Use District would be created at Candlestick Point. The Special Use District would largely supersede the underlying zoning described above and refer to Redevelopment Plan documents in regards to allowed uses and development controls. A new Height and Bulk District would also be created for Candlestick Point that would lay out general parameters for allowed heights but would also refer to Redevelopment Plan documents for specific height and bulk limits and requirements at a more localized level.

For HPS Phase II, a base Use District would established for the sake of Planning Code mapping. Like Candlestick Point, a new Special Use District and a new Height and Bulk District would be created for the area. The SUD would largely supersede the new underlying Use District zoning and would refer to the BVHP Redevelopment Plan documents; the Height and Bulk District would similarly lay out general parameters for allowed heights but would also refer to the BVHP Redevelopment Plan documents for specific height and bulk limits and requirements at a more localized basis. The Project would be consistent with the *San Francisco Planning Code* once amended.

The Sustainability Plan

In 1993, the San Francisco Board of Supervisors established the Commission on San Francisco's Environment, charged with, among other things, drafting and implementing a plan for San Francisco's long-term environmental sustainability. The notion of sustainability is based on the United Nations definition that "a sustainable society meets the needs of the present without sacrificing the ability of future generations and non-human forms of life to meet their own needs." The Sustainability Plan for San Francisco was a result of community collaboration with the intent of establishing sustainable development as a fundamental goal of municipal public policy.

The Sustainability Plan is divided into fifteen topic areas, ten that address specific environmental issues (air quality; biodiversity; energy, climate change and ozone depletion; food and agriculture; hazardous materials; human health; parks, open spaces, and streetscapes; solid waste; transportation; and water and wastewater), and five that are broader in scope and cover many issues (economy and economic development, environmental justice, municipal expenditures, public information and education, and risk management). Additionally, the Sustainability Plan contains indicators designed to create a base of objective information on local conditions and to illustrate trends toward or away from sustainability. Although the Sustainability Plan became official City policy in July 1997, the Board of Supervisors has not committed the City to perform all of the actions addressed in the plan. The Sustainability Plan serves as a blueprint, with many of its individual proposals requiring further development and public comment.

Project Consistency: The Project contains a number of features that would respond to policies articulated in the Sustainability Plan, including:

- Provide neighborhood-serving retail.
- Provide automobile, public transportation, and pedestrian connections between the Shipyard, Candlestick Point, and the larger BVHP neighborhood.
- The urban design of the Project would reduce its footprint and allow for transportation and open space corridors.
- Integrate land use patterns with multimodal street networks that would facilitate walking and cycling for internal trips and transit for trips of greater distance.
- Extend existing Muni routes to better serve the Project site and area; increase frequencies on existing routes to provide more capacity; and complement those existing routes with new transit facilities and routes that would serve the Project's proposed land use program and transit demand.
- The Project is a redevelopment project and would not result in the conversion of any new land to settlement.
- Plant up to 10,000 net new trees at the Project site and in the community.

- Exceed the 2008 Standards for Title 24 Part 6 energy efficiency standards for homes and businesses by at least 15 percent.
- Install ENERGY STAR[61] appliances, where appliances are offered by homebuilders.
- Use energy efficient street lighting.

III.B.3 Regulatory Framework

Federal

Refer to subsection III.B.2 (Setting) regarding the application of the *Coastal Zone Management Act*.

State

Refer to Section III.B.2 (Setting) regarding the application of the CPSRA General Plan and SB 792 to the implementation of the Project.

Regional

Refer to Section III.B.2 regarding the application of the San Francisco Bay Plan, the San Francisco Bay Trail Plan, and the Bay Area Seaport Plan to the implementation of the Project.

Local

Refer to Section III.B.2 regarding the application of the San Francisco General Plan, Bayview Hunters Point Area Plan, Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, *San Francisco Planning Code*, the Sustainability Plan, and the Accountable Planning Initiative to the implementation of the Project.

III.B.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to land use and plans, but generally consider that implementation of the Project would have significant impacts if it were to:

B.a Physically divide an established community

B.b Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect

B.c Have a substantial adverse impact on the existing character of the vicinity

[61] The term ENERGY STAR is capitalized as is the convention used by the United States Environmental Protection Agency and Department of Energy.

Analytic Method

The analysis compares land use conditions at full build-out of the Project against the existing land use environment, on the ground, as of the date of publication of the NOP. The Project would be built out by the year 2031, with full occupancy occurring in 2032. Changes in land use character at Project build-out are described and assessed according to the significance criteria listed above.

The analysis considers whether the Project would contribute to physical division of an established community by constructing physical barriers or obstacles to circulation that would restrict existing patterns of movement between the Project site and the Bayview Hunters Point neighborhood. The Project's contribution to the continuity of the existing land use and circulation patterns is also considered in this analysis.

The analysis of the Project's effect on existing land use character includes consideration of the character of proposed development relative to the existing land use context. An adverse effect would occur if a new use were placed next to an incompatible existing use, such that the basic function of either the existing use or the new use would be impaired. For example, if a residential use were located next to a factory with toxic air emissions, either or both uses would be unable to function as intended.

The analysis also discusses whether the Project would be consistent with applicable land use plans and policies that were adopted for the purpose of avoiding or mitigating an environmental impact. Land use policies are policies that pertain to the type, location, and physical form of new development.

CEQA Guidelines section 15125(d) states, "The EIR shall discuss any inconsistencies between a proposed project and applicable general plans and regional plans." The Plans and Policies section of this EIR section includes a comprehensive discussion of the relationship of the Project, including the proposed Plan amendments and Planning Code changes, with the San Francisco General Plan, Redevelopment Plans, and with pertinent regional plans.

Additionally, the Project's potential contribution to cumulative land use impacts are evaluated in the context of existing, proposed, and reasonably foreseeable future development expected in the Project vicinity.

Construction Impacts

There are no construction impacts with respect to Land Use and Plans.

Operational Impacts

Impact LU-1: Physical Division of an Established Community

Impact LU-1 **Implementation of the Project would not physically divide an established community. (No Impact) *[Criterion B.a]***

Candlestick Point

Currently the Candlestick Point site contains Candlestick Park Stadium, parking areas, and a number of large, vacant parcels. Pedestrian access to the CPSRA and the San Francisco Bay from surrounding land uses is limited. Most non-arterial streets from the residential neighborhoods to the west of Candlestick

Point reach a dead end before entering the site. In addition, Bayview Hill creates a physical barrier to the south, limiting access from this direction, except at Harney Way. The lack of street connectivity, combined with the site's large, barren parcels, lack of sidewalks, and low level of on-site activity, make Candlestick Point relatively unwelcoming to pedestrian traffic.

The existing Alice Griffith housing site is gated off from surrounding uses, and there are no neighborhood-serving retail uses or community uses at Candlestick Point. There is existing multi-family residential development on Jamestown Avenue.

The Project would develop new districts, with a new street grid pattern, medium- to high-density residential uses, regional and neighborhood retail uses, a hotel, and arena uses. The Project would include new open space within Candlestick Point districts and would improve the CPSRA areas. The street pattern, open space network, and pedestrian facilities are specifically planned to facilitate connections between developed areas of Candlestick Point and the CPSRA, other BVHP neighborhoods, and HPS Phase II. The Yosemite Slough bridge would provide pedestrian, bicycle, and transit routes between Candlestick Point and HPS Phase II.

A number of roads separate the existing public open space from the rest of Candlestick Point; including Harney Way, Jamestown Avenue, Hunters Point Expressway, Gilman Avenue, Fitzgerald Avenue, Arelious Walker Drive, and Carroll Avenue. The Project would improve Harney Way as a major roadway serving Candlestick Point by widening it and providing new capacity for both autos and other modes of transportation. Following Project implementation, Harney Way would include two additional lanes for dedicated Bus Rapid Transit use, a new left-hand turn/multi-directional lane, potentially one new travel lane, and new bikeways, but would not create a new separation between existing residential or commercial areas and other uses within Candlestick Point. The Project would also have pedestrian facilities that would allow for safe access across Harney Way. Thus, the Harney Way improvements would enhance access within Candlestick Point and between Candlestick Point and other areas, including the HPS Phase II and Executive Park, for existing and future residents and visitors. Consequently, these improvements would not divide an existing community.

The Alice Griffith Public Housing site would be redeveloped with a mix of replacement public housing, affordable housing, below-market rate housing, and market-rate housing that would integrate the street pattern of the existing BVHP neighborhood and the Candlestick Point street pattern.

The Jamestown Avenue district would replace vacant lots with market rate housing at heights of 65 and 85 feet that are consistent with other development on Jamestown Avenue; thus building on and maintaining the existing character of this area.

- There are five blocks with privately owned parcels on Candlestick Point that the Applicant seeks to acquire for the development, including one on Jamestown Avenue (currently vacant) in the Jamestown District and four contiguous blocks (currently vacant or developed with an RV park) in the Candlestick Point North District. If these private parcels are not acquired by the Applicant, they would be permitted under the BVHP Redevelopment Plan and the Planning Code to develop via an Owner Participation Agreement (OPA) in a manner that is consistent with the BVHP Redevelopment Plan or would be allowed to operate as an existing non-conforming use. For those parcels that are currently developed, or for any of the parcels if they develop via an OPA, that development would be included in the overall total development that would occur on the Project site. The total amount of development would not change; that is, the Applicant's development on

the remaining portion of the site plus any development under separate OPAs as envisioned under the Project would result in the same overall development level as proposed by the Applicant.

The Project would include new public gathering spaces and neighborhood-oriented commercial uses that would serve residents throughout the Bayview Hunters Point neighborhood, including the existing residents of Alice Griffith Public Housing and Jamestown Avenue. The existing block pattern would be extended towards the Bay, and multi-modal (pedestrian, bicycle, transit and automobile) circulation improvements would improve connectivity between Candlestick Point and neighboring communities (refer to Figure II-9 [Proposed Parks and Open Space] through Figure II-13 [Proposed Transit Improvements], respectively). Proposed circulation improvements include installation of sidewalks and other pedestrian improvements along existing streets between Candlestick Point and HPS Phase II, new bicycle lanes, rerouting of bus service to the HPS Phase II site, traffic calming features, a bridge across Yosemite Slough, and a waterfront pedestrian and bicycle corridor from Candlestick Point to the northeast boundary of the HPS Phase II site connecting to the trail facilities along the India Basin shoreline (refer to Candlestick Park discussion).

One of the Project's objectives is to create an integrated development that would create a cohesive development and improve connectivity between Candlestick Point and surrounding communities. The street pattern, open space network, and pedestrian facilities would be planned to facilitate connections between the Project and the surrounding community.

While Harney Way would be widened and would extend through the existing Stadium site, it would not separate existing uses. Existing development to the north of Harney Way, such as Executive Park, would still have the same relationship to the shoreline and other resources as it currently does, although Harney Way would be widened and provide an improved configuration. Existing uses would still be located to the west, north of Harney Way and new land uses within Candlestick Point South would be to the east of Harney Way. In addition, pedestrian crossings would be provided that would facilitate movement between the existing community and Candlestick Point South.

Within Candlestick Point, the Project would create a new district with no physical divisions. Although the Project would change some of the existing land uses in the area and increase the density and intensity of development, the Project would provide new parks, public gathering places and uses that would serve existing and new residents. The Project would provide new multi-model transportation connections within the Project site and to the surrounding neighborhood, and also provide new access to the Bay and Yosemite Slough.

The Project would, thus, not divide an established community at Candlestick Point; therefore, no impact would occur.

HPS Phase II

In the past, HPS operated as a secured military site and has also contained some commercial and industrial uses, with little physical connectivity to the surrounding community. Currently, artist studios are the only active uses at the HPS Phase II site. Large undeveloped parcels and vacant buildings surround these uses, isolating them from uses in the neighboring Bayview Hunters Point community. There is limited street access to the HPS Phase II site.

The Project would develop new districts, with a new grid street pattern, medium- to high-density residential uses, neighborhood retail uses, research and development uses, the 49ers Stadium, and associated parking uses at HPS Phase II. The Project also would include new open space, parks, and recreational areas throughout the HPS Phase II districts and along the shoreline. The street pattern, open space network, and pedestrian facilities would be planned to facilitate connections between the Project and the under-construction HPS Phase I development, the India Basin neighborhood, other BVHP neighborhoods, and Candlestick Point.

Proposed development at HPS Phase II would redevelop currently underutilized parcels and would extend the street grid from the surrounding neighborhood to the HPS Phase II site, providing improved connectivity between existing and proposed residential and retail uses to the west of the HPS Phase II site (refer to HPS Phase I site). Development at HPS Phase II would provide identifiable retail and community areas at the HPS Center, connected by the pedestrian, bicycle, transit, and street improvements shown in Figure II-9 through Figure II-13 in Chapter II. Proposed circulation improvements would include installation of sidewalks and other pedestrian improvements along existing streets between Candlestick Point and HPS Phase II, new bicycle lanes, rerouting of bus service to the HPS Phase II site, traffic calming features, the Yosemite Slough bridge, and a waterfront pedestrian and bicycle corridor from Candlestick Point to the northeast boundary of the HPS Phase II site connecting to the trail facilities along the India Basin shoreline.

While Innes Avenue would be repaved and restriped from Jennings Street to the Project boundary, it would not separate existing uses. The existing hillside development to the north of Innes Avenue would still have the same relationship to the shoreline and other resources with regard to Innes Avenue as it currently does, albeit in an improved configuration. Existing hillside uses would still be located to the west and south of Harney Way and the shoreline would be to the north and east of Innes Avenue, and the roadway would not be widened. In addition, pedestrian crossings would be provided that would facilitate movement between the existing hillside community and the shoreline.

Overall, the Project would improve the connectivity of this area to HPS Phase I, Candlestick Point, other surrounding neighborhoods, and other areas of the City. While the Project would change the land uses and increase the intensity of development on the site, the proposed HPS Phase II development would not divide an established community. Furthermore, development at HPS Phase II would improve and provide new pedestrian, bicycle, transit, and street connections within the Project site and to the surrounding community, and also provide new retail and community areas at the HPS Center. The Project would not divide an established community; therefore, no impact would occur.

Summary

In summary, the Project site generally includes underutilized and vacant parcels with limited access to the Bay shoreline and CPSRA. Connectivity between the Bayview Hunters Point neighborhood, Candlestick Point and HPS Phase II is limited. Large parking lots and vacant parcels at Candlestick Point separate the Bayview Hunters Point neighborhood from the Bay shoreline, and primary access roads do not include pedestrian, transit or bicycle features. Access to HPS Phase II is restricted to certain areas (those areas used for artist studios), and the area remains isolated from surrounding neighborhoods. The Project would maintain residential communities at Alice Griffith public housing and at Jamestown Avenue.

The Project proposes infill development, centered on nodes of commercial and retail activity at Candlestick Point and HPS Phase II with no physical divisions. Residential and non-residential infill around these nodes of activity would provide a more continuous land use pattern and street grid, provide new services and community amenities in the Bayview Hunters Point neighborhood, allow better access to parks and recreational facilities (which would be improved under the Project), and remove existing barriers to circulation and access. The Project would not divide an established community; therefore, no impact would occur. No mitigation is required.

Impact LU-2: Conflict with Plans, Policies, or Regulations

Impact LU-2 **Implementation of the Project would not conflict with land use plans, policies, or regulations adopted to avoid or mitigate an environmental effect. (Less than Significant) *[Criterion B.b]***

Applicable plans that direct or regulate development on the Project site include the San Francisco General Plan, Candlestick Point State Recreation Area General Plan, San Francisco Bay Plan, San Francisco Bay Trail Plan, Bay Area Seaport Plan, Bayview Hunters Point Area Plan, Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, and San Francisco Planning Code. San Francisco's Sustainability Plan also applies to the Project. The Project Consistency analyses in the Plans and Policies section above describe the Project's consistencies and inconsistencies with these plans; these analyses are summarized here:

The Project is consistent with San Francisco's Proposition G (2008) and contains a variety of policies that respond to the City's Sustainability Plan.

The Project is inconsistent with the port use designations in the San Francisco Bay Plan and the Bay Area Seaport Plan, because both of these plans designate parts of the Project site for port uses that would not be developed under the Project. These inconsistencies do not constitute a significant environmental impact because the port use designations were not adopted to avoid or mitigate an environmental effect. By creating parks and open space in areas previously designated for industry, the Project uses proposed for this area will have fewer environmental impacts than the port use designations in these plans. As explained above, these designations do not reflect current economic conditions affecting the maritime shipping industry in San Francisco. Amendment of these plans to bring them into line with current conditions would be required before the inconsistent aspects of the Project can be implemented. The project is generally consistent with the other goals and policies of these plans.

The Project is generally consistent with the policies and goals of the other applicable plans, including the Candlestick Point State Recreation Area General Plan, San Francisco Bay Trail Plan, San Francisco Bay Plan, City of San Francisco General Plan (including the Bayview Hunters Point Area Plan), Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, and City of San Francisco Planning Code. As explained in the analyses of individual plans, however, the Project is inconsistent with various land use designations contained in those plans.

Many of these inconsistencies are consequences of those plans' continued reflection of former plans for the Project site. For example, the BVHP Area Plan and Redevelopment Plan designate land on Candlestick Point for a football stadium or stadium-mall development. Similarly, the Hunters Point Shipyard

Redevelopment Plan designates large areas along the Hunters Point waterfront for industrial uses; the Project would develop these areas as parks and open space. The Project also differs from the Hunters Point Shipyard Redevelopment Plan in its development pattern of research and development, residential and other uses.

These inconsistencies would be eliminated with the proposed amendments to the relevant plans that are part of the Project, but do not reflect any impacts to the environment that the plans and policies seek to avoid. As described in connection with the Bay Plan and Seaport Plan, the designation of industrial uses along the waterfront is not a policy adopted to protect the environment, and the Project's proposals for this land represent an environmental improvement. Inconsistencies regarding the development pattern at HPS and the uses on Candlestick Point simply reflect the shifting locations of proposed uses within the site. The Project's proposed changes in the arrangement of land uses would not implicate any environmental protection objectives of the current land use designations in the redevelopment plans and other applicable land use plans; thus, the inconsistencies do not give rise to a significant impact on the environment.

Several of the plans include maps reflecting the existing boundary of Candlestick Point State Recreation Area. The Project's proposed reconfiguration of CPSRA would change that boundary, rendering it inconsistent with such maps. In several instances, the Project's inconsistencies with a plan (such as the Bay Trail Plan and the CPSRA General Plan) reflect an improvement over the current plan and would advance the plan's goals and objectives (refer to Section III.P for a discussion of proposed improvements to CPSRA).These inconsistencies are, therefore, not considered significant environmental impacts.

The Project would be inconsistent with the *San Francisco Zoning Code*'s "Public" or "P" designation for Candlestick Point. This zoning is descriptive, reflecting the site's use as CPSRA and Candlestick Park stadium. The Project would maintain CPSRA's public nature, and improve its recreational opportunities as described above. The Project would replace the stadium and other public facilities at Candlestick Park with a variety of new uses, but those facilities do not provide environmental protection or other environmental benefits. Similarly, the zoning inconsistencies related to the widening of Harney Way and the Walker-Crisp road connection do not relate to designations that protect the environment. If the Applicant is unable to acquire any or all of the privately owned parcels on Candlestick Point, the private parcels would be permitted under the BVHP Redevelopment Plan and the Planning Code to develop via an Owner Participation Agreement (OPA) in a manner that is consistent with the BVHP Redevelopment Plan, or would be allowed to operate as an existing non-conforming use. Thus, the Project's inconsistency with the P zoning is not considered a significant environmental impact.

Amending each of these plans to achieve consistency would be a part of the approval and entitlement process for the Project. Amendments of the Redevelopment Plans, General Plan, and *Planning Code* are part of the Project. The Project as approved and developed would thus be consistent with the relevant plans and policies, once amended.

Overall, the Project would have a less-than-significant environmental impact related to land use plans and policies. No mitigation is required.

Impact LU-3: Impact on Existing Land Use Character

Impact LU-3 **Implementation of the Project would not have a substantial adverse impact on the existing character of the vicinity. (Less than Significant)** ***[Criterion B.c]***

Candlestick Point

The Project would alter the land use character at Candlestick Point with new development of residential uses, regional and neighborhood retail uses, an arena, and public open space. The Project would remove Candlestick Park stadium and associated paved and unpaved parking lots; the Project would also include redevelop the existing Alice Griffith public housing site, and remove other existing uses, such as the Candlestick RV Park. The Project would extend the existing Bayview street grid and block pattern into Candlestick Point. The open space network would connect to existing CPSRA. As discussed above in Setting, State Recreation Area Boundary Designation, CPRSA lands at would be reconfigured and improved as part of the Project.

Land uses immediately surrounding Candlestick Point are varied, and include light industrial uses to the north; single-family residential, newer multi-family residential units and townhomes and apartments generally to the northwest, and Executive Park to the west. At present, the existing development at Executive Park consists of three office buildings and residential buildings; Executive Park is proposed to be redeveloped with residential uses replacing the office buildings. The scale of nearby development ranges from two-story residential structures to taller apartment and office structures.

The Project would result in a substantially different built environment compared to the existing character of the site and vicinity. The scale of development would contrast with existing patterns; Candlestick Point would include residential towers ranging from 220 feet to 420 feet in height, and regional retail and arena uses. The mixed-use pattern with the Project at Candlestick Point would transition from lower-density residential uses near existing neighborhoods to higher density residential and commercial uses. Development at Candlestick Point would have similar land uses as existing and proposed uses in Executive Park immediately to the west. With the transition in scale and uses, the extension of the existing street grid, and with the connectivity of new open space with existing shoreline open space, the Project would be compatible with surrounding land uses. The Project would not result in a substantial adverse change in the existing land use character at Candlestick Point or adjacent areas. The impact would be less than significant.

HPS Phase II

The Project would alter the land use character at HPS Phase II with new development of R&D uses, residential uses, neighborhood retail uses, a football stadium, and public open space. The Project would remove with the most of the large, vacant industrial and administrative buildings as well as develop HPS Phase II areas where buildings have already been cleared. The Project would retain certain historic structures, piers, drydocks, and the prominent Re-gunning crane. The Project would extend the existing street grid and block pattern into HPS Phase II. The open space network would connect to the shoreline to the north and south.

Land uses near HPS Phase II include the India Basin community to the north with residential and some light industrial uses. The area adjacent to the HPS Phase II site to the southwest contains multi-family

housing and single-family attached units on Hunters Point Hill. Farther west are residential neighborhoods in the Palou Avenue corridor, and industrial uses in South Basin. The scale of nearby development ranges from two-story residential structures to larger scale warehouse and light-industrial structures.

The Project would alter the land use character at HPS Phase II with new development of residential uses, regional and neighborhood retail uses, an arena, and public open space.

The Project would result in a substantially different built environment compared to the existing character of the site and vicinity. The scale of development would contrast with existing patterns; HPS Phase would include two residential towers ranging from 270 feet to 370 feet in height. The football stadium would be a large-scale public facility, with related parking and dual-use open space areas. While this would be a new land use element at HPS Phase II, it would replace the similar-scale use at Candlestick Point. The mixed-use pattern with the Project at HPS Phase II would transition from lower-density residential uses near existing neighborhoods to higher density residential and R&D uses. With the transition in scale and uses, the extension of the existing street grid, and with the connectivity of new open space with existing shoreline open space, the Project would be compatible with surrounding land uses. The Project would not result in a substantial adverse change in the existing land use character at HPS Phase II or adjacent areas. The impact would be less than significant.

Summary

The Project would alter the land use character at the Project site with new development of residential uses, R&D uses, regional and neighborhood retail uses, a football stadium, an arena, and public open space. The Project would extend the existing street grid and block pattern into HPS Phase II. The open space network would connect to the shoreline to the north and south.

This development would be considered to improve the existing land use conditions, and would not have an adverse effect on land use character of the Project site itself.

The Project would result in a substantially different built environment compared to the existing character of the site and vicinity. With the transition in scale and uses, the extension of the existing street grid, and with the connectivity of new open space with existing shoreline open space, the Project would be compatible with surrounding land uses. The Project would not result in a substantial adverse change in the existing land use character at the Project site or vicinity. The impact would be less than significant. No mitigation is required.

Cumulative Impacts

The geographic context for evaluation of cumulative impacts associated with land use changes is the surrounding areas of the Bayview Hunters Point neighborhood, including Executive Park and India Basin These areas contain a mix of land uses, including residential, commercial, and industrial. The past and present development in these areas is described in Section III.B.2, above, representing the baseline conditions for evaluation of cumulative impacts to land use. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects in the entitlement process. Those forecasts account for other major projects currently in various stages of the approval process, including the India Basin Shoreline Plan, the Executive Park project, HPS Phase I, Jamestown,

- and Hunters View. In addition, the Yosemite Slough Restoration Project, which has been approved and would add approximately 12 acres of wetlands to the tidally influenced area of Yosemite Slough, is considered in this cumulative context. Future conditions would also account for land use changes expected through implementation of the Bayview Hunters Point Redevelopment Plan.

  Future development within those areas would result in changes to the existing land use through conversion of vacant land to developed uses or through the conversion of existing land uses. Development in those areas would also be subject to environmental and planning review that would ensure compatibility with adjacent land uses. It is anticipated that all future projects proposed in these areas would be consistent with the adopted goals, policies, and objectives of the area Plans and would improve rather than degrade the existing character of the land uses.

  The Project would result in a substantially different built environment compared to the existing character of the site and vicinity but would develop new uses that would be compatible with other development in the Project vicinity. As noted, above, the Project would increase residential and non-residential densities at the Project site and would be compatible with the existing land use character. Development patterns would include transitions from low-density residential uses to higher density residential and commercial uses. The transition in scale between adjacent neighborhoods and the Project site, and the varied range of proposed uses, would not result in a substantial adverse change in the existing land use character. Since development of cumulative projects within the defined geographic context would not result in an adverse impact on existing land use character, there would be no cumulative impact to which the Project could contribute. Therefore, the cumulative impact would be less than significant.

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SECTION III.C POPULATION, HOUSING, AND EMPLOYMENT

III.C.1 Introduction

This section describes the existing and projected population, housing, and employment characteristics of the Project and examines the potential for the Project to (1) induce substantial unplanned population growth either directly or indirectly, or (2) displace existing housing or residents. This section evaluates the potential for both Project level and cumulative environmental impacts. The analysis in this section concludes that no potentially significant or significant environmental impacts would result from the Project; therefore, no mitigation measures are included.

Section III.C.3 (Regulatory Framework) also provides information regarding the City's affordable housing policies. However, because changes in housing affordability levels are socioeconomic effects, no significance determination is provided with respect to these issues; information pertaining to these topics is provided for informational purposes only.

Further, the Navy will be preparing a supplemental environmental assessment for the Hunters Point Shipyard Base Reuse. In Potential impacts on minority and low-income populations are addressed in Appendix C1 (Environmental Justice Report).

III.C.2 Setting

■ Population

Regional Overview

The San Francisco Bay Area has experienced an influx of population over the past several decades that is expected to continue into the foreseeable future, albeit at a more gradual rate than in past decades. The 2007 Association of Bay Area Governments (ABAG) projections estimate that there were approximately 7 million residents living in the Bay Area in 2005. Between 2000 and 2005, the regional population of the Bay Area grew by just under 1 percent per year; growth through 2030 is expected to occur at approximately this same rate,[62] adding 916,800 residents by 2030 (refer to Appendix C2 [Population Projections]).[63]

The population in the City as of January 1, 2008, was 824,525, its highest population on record.[64] In terms of population, San Francisco is the second largest city in the Bay Area, following San Jose.

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[62] Association of Bay Area Governments, *Projections 2007*, December 2006.
[63] Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009. Population projections in this memorandum include Project populations.
[64] California Department of Finance, *E-1 Population Estimates for Cities, Counties, and the State with Annual Percent Change—January 1, 2008 and 2009*, 2009. http://www.dof.ca.gov/research/demographic/reports/estimates/e-1_2006-07 (accessed online June 12, 2009). Also cited by Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project,* 2009.

Project Site

Table III.C-1 (Existing Population [2005]) presents information on the 2005 population of the Project site. For purposes of this analysis, 2005 data is used to represent baseline conditions as 2005 data is the most current data consistently available for the Project site across all population, employment, and housing indices. However, where more current data is available for the City as a whole, those data are also provided to demonstrate how conditions have changed, or remained the same, since 2005.

Table III.C-1 Existing Population (2005)

Analysis Area	*Population*	*Households*[a]	*Persons per Household*[b]
Candlestick Point	1,113[c]	292[c]	3.8
HPS Phase II	0[c,d]	0[c,d]	N/A
Project Site Total	***1,113***	***292***	***3.8***
San Francisco	783,441[e,f]	341,478[e]	2.3
San Mateo County	487,977[g]	252,648[g]	1.9

SOURCES:

a. Households are occupied units, not total units.
b. The total persons per household ratio was calculated by dividing totals in the Population column by the totals in the Households column.
c. Population and household data for the Project site are 2005 data from San Francisco County Transportation Authority, *TAZ Model Data*, 2008. These data include 256 permanent residents of the Alice Griffith Housing Complex and approximately 36 residents located within the TAZ boundaries, but outside of the Candlestick Point site. For purposes of the EIR analysis, it is assumed that 256 households are located within the Candlestick Point portion of the Project site.
d. The City uses traffic analysis zones, or TAZs, to predict population, employment, and housing trends at the local level. The TAZ boundaries do not completely coincide with Project site boundaries, which contributes to slight discrepancies in the data reported. The TAZ that includes the HPS Phase II site includes a portion of nearby Mariners Village and Morgan Heights residential neighborhoods. Housing unit and population attributable to these areas have been removed from the totals reported above, as there is currently no housing at HPS Phase II.
e. The population and households data reported for San Francisco is 2005 data provided in Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009.
f. The text on page III.C-2 reports that the San Francisco population was 824,525 in 2008. This table presents 2005 numbers, as 2005 data is the most current data available across all population, housing, and employment indices for the Project site.
g. Population and household data for San Mateo County is 2005 data from US Census, *2005–2007 American Community Survey*, 2005. http://factfinder.census.gov (accessed online June 12, 2009).

The existing population and household data for the Project site are taken from 2005 data from San Francisco County Transportation Authority, *TAZ Model Data (*2008), which also includes units within the TAZ boundary, but outside of the Project site. As of 2005, there were approximately 298 existing housing units within the TAZ boundary, as shown in Table III.C-1, with only 292 occupied, as shown in Table III.C-2; however, there are only 256 existing units within the Candlestick Point portion of the Project site, all of which are associated with the Alice Griffith Housing Complex. There are no households associated with the HPS Phase II portion of the Project site. For purposes of the EIR analysis, it is assumed that 256 households are located within the Candlestick Point portion of the Project site.

The 2005 population[65] at the Project site was approximately 1,113 persons,[66] about 0.14 percent of San Francisco's population in the same year. There are no existing residents at HPS Phase II. The majority of the residents at Candlestick Point live in the Alice Griffith housing complex, while a small number are residents of Jamestown Avenue.

Using the TAZ population and household data, which includes limited areas outside of the Project site, there is an average of 3.8 persons per household, 1.5 more persons than the average San Francisco household. The larger household size in comparison to other parts of the City may be due to larger housing units, occupancy above optimal housing unit capacity (overcrowding), or a combination of both factors.

The average San Francisco household size grew during the latter part of the 20th century, particularly during the 1990s as housing costs rose and forced shared rentals.[67] In the future, citywide household sizes are expected to stay relatively constant or shrink slightly as a result of changing demographic trends.[68] Factors contributing to a decrease in household size include smaller family size and lower birth rates, a greater prevalence of single-person households, longer life spans, greater geographic mobility, and greater independence for seniors. Relative to other parts of the City, the Bayview Hunters Point neighborhood experiences a higher number of residents per habitable room.[69] As new housing varying in affordability, type, and size is developed in the area, existing crowding is expected to be alleviated. The Project would provide a range of housing sizes, including studios to 4 bedrooms, and the average housing unit would be 2.5 bedrooms. As a result, the household size at the Project site is expected to decrease to 2.33 people per unit by 2030, consistent with the 2005 citywide average and the average identified in the General Plan Housing Element. A 2.3-person household size is thus used to estimate future population for the Project site.

Housing

Regional Overview

Over the course of the past several decades, the construction of housing in the region has failed to keep pace with population growth in the Bay Area. Although population growth has slowed and is predicted to continue at a relatively moderate rate through 2030, the region is still attempting to make up for housing shortages from previous growth periods. The lack of local housing options causes many Bay Area residents to seek housing in the Sacramento region and Central Valley, resulting in long commutes and significant impacts on the regional transportation system.[70]

This housing shortage is compounded in San Francisco by additional factors. San Francisco was historically developed as an employment center, which means that there are more jobs than housing units in the City. In addition, San Francisco is relatively built up, with few tracts of land available for development of new housing. Although the City does not have an adopted jobs-housing ratio target, Policy 1.9 of the Housing Element of

[65] Data for 2005 are the most current data consistently available across all population, housing, and employment indices for the Project site. Thus, 2005 is considered to be the baseline year for existing conditions.
[66] These 1,113 persons include those temporary residents at the Candlestick Point RV Park in addition to the permanent residents (256 households) at Alice Griffith Public Housing.
[67] City and County of San Francisco, General Plan Housing Element, 2004.
[68] City and County of San Francisco, Draft General Plan Housing Element, Part 1: Data and Needs Analysis, 2009.
[69] City and County of San Francisco, General Plan Housing Element, 2004.
[70] Association of Bay Area Governments, *Projections 2007,* 2006.

the San Francisco General Plan encourages new commercial developments that would generate employment to also develop housing or pay in-lieu fees through the City's Jobs-Housing Linkage Program.[71]

As shown in Table III.C-2 (Existing Housing Characteristics [2005]), below, there were approximately 346,527 housing units in San Francisco in 2005. The City had a vacancy rate of approximately 4.9 percent, and approximately 62 percent of its total housing stock consisted of rental units. In 2005, the number of households totaled 341,478, and by 2008, the number of households had risen to 344,792.[72] ABAG projections indicate that the number of households in San Francisco would increase by 0.6 percent annually through 2030, roughly the same as for projected population increases, although the household increases between 2005 and 2008 were only about 0.3 percent per year. Because the Project site is in the southeastern portion of the City, activities at the site contribute to housing demand in nearby San Mateo County communities. Table III.C-2 also shows existing housing characteristics for San Mateo County.

Table III.C-2 Existing Housing Characteristics (2005)

Analysis Area	*Housing Units (2005)*	*Vacancy Rate*[a]	*Rental Units as Percent of Total*	*Households*[b]	*Persons per Household*[b]
Candlestick Point	298	2.1%	100%	292	3.8
HPS Phase II	0	N/A	N/A	0	N/A
Project Site Total	***298***[c]	***2.1%***	***100%***	***292***	***3.8***
San Francisco	346,527[d]	4.9%	61.6%[e]	341,478[g]	2.3
San Mateo County[e,f]	266,469	5.2%	37.1%[e]	252,648	2.8

SOURCES:

a. The number of vacant units is the difference between total housing units and households (occupied units). Vacancy rates were calculated by dividing the number of vacant units by the total in the Housing Units (2005) column.
b. Household (occupied housing unit) data and persons per household for Candlestick Point are from Table III.C-1. Population and household data for the Project site are 2005 data from San Francisco County Transportation Authority, *TAZ Model Data*, 2008. These data include 256 permanent residents of the Alice Griffith Housing Complex and approximately 36 residents located within the TAZ boundaries, but outside of the Candlestick Point site. For purposes of the EIR analysis, it is assumed that 256 households are located within the Candlestick Point portion of the Project site.
c. The only existing housing units at the Project site are those at the Alice Griffith housing complex.
d. Housing unit data for San Francisco are 2005 data from ABAG, *2007 Projections*, 2006.
e. Rental unit percentages for San Francisco and San Mateo County are 2005 data from US Census, *2005–2007 American Community Survey*, 2005. http://factfinder.census.gov (accessed online June 12, 2009).
f. Housing unit data for San Mateo County are 2005 data from US Census, *2005–2007 American Community Survey*, 2005. http://factfinder.census.gov (accessed online June 12, 2009).
g. The population and households data reported for San Francisco is 2005 data provided in Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009.

Regional Housing Needs Plan

To respond to statewide population and household growth and to ensure the availability of affordable housing for all income groups, the State enacted *Government Code* Section 65584 in 1981, which requires each Council of Governments (COG) to periodically distribute State-identified housing needs to all jurisdictions within its region. The California Department of Housing and Community Development (HCD) is responsible for determining this regional need and for initiating the process by which each COG must then distribute its share of Statewide need to all jurisdictions within its region. This statute requires

[71] City and County of San Francisco, General Plan Housing Element, 2004.
[72] Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project,* 2009.

COGs to develop a new Regional Housing Needs Plan (RHNP) every five years. In June 2008, ABAG released its RHNP, which documents the Regional Housing Needs Allocation (RHNA) for the Bay Area for the June 2007 to June 2014 planning period.[73]

Government Code Section 65584 requires that a city's share of regional housing needs include housing needs for persons at all income levels. The different income levels to be studied within the parameters of State-mandated local Housing Elements, which must be prepared by every county and city in California, are "Very Low Income," "Low Income," "Moderate Income," and "Above Moderate Income." Based on a US Department of Housing and Urban Development (HUD) formula, San Francisco's Area Median Income (AMI) in 2006 was estimated to be approximately $77,450 for a two-person household and approximately $87,100 for a three-person household.[74] San Francisco is estimated to have the income level distribution shown in Table III.C-3 (San Francisco Income Distribution).

Table III.C-3 San Francisco Income Distribution

Income Group	*Income Level*	*Income Range*[a]
Very low	≤ 50% of AMI	≤ $38,725
Low	50–80% of AMI	$38,725–$61,960
Moderate	80–120% of AMI	$61,960–$92,940
Above Moderate	> 120% of AMI	> $92,940

SOURCES: City of San Francisco, General Plan Housing Element, 2004; City and County of San Francisco, Mayor's Office of Housing, *Income Limits and Sales Price Levels for MOH Homeownership Programs*. http://www.sfgov.org/site/moh_page.asp?id=62375 (accessed August 27, 2009).

a. Based on San Francisco's AMI in 2006 of $77,450 for a two-person household.

The ABAG Policy Board established housing needs for all jurisdictions within its boundaries for the 2007 to 2014 planning period by using a "fair share" approach, based on household and job growth of the region, as well as regional income level percentages. Each jurisdiction is required by state law to incorporate its housing need numbers into an updated version of its general plan housing element. According to ABAG's RHNP, the Bay Area's overall housing need would total about 214,500 new units by June 2014.[75] The jurisdictional need of the City is estimated to be 31,193 units, or an average annual need of 4,456 new units.

Although market conditions affect the City's ability to meet the RHNA targets, the City facilitates the development of housing by providing regulatory incentives for private housing developers. If the RHNA targets are not met, the resulting competition for the limited housing supply drives the price of housing up, making it less affordable to working families. The City did not meet its RHNA targets for the 1999–2006 period. However, over 17,470 new housing units, or almost 86 percent of the housing production targets, were met.[76] During this time, the City met approximately 83 percent of its Very Low Income

[73] Association of Bay Area Governments, *San Francisco Bay Area Housing Needs Plan, 2007–2014,* 2008.
[74] City and County of San Francisco, Mayor's Office of Housing, *Income Limits and Sales Price Levels for MOH Homeownership Programs.* http://www.sfgov.org/site/moh_page.asp?id=62375 (accessed August 27, 2009).
[75] Association of Bay Area Governments, *San Francisco Bay Area Housing Needs Plan, 2007–2014*, 2008.
[76] City and County of San Francisco, Draft 2009 Housing Element*, General Plan*, http://housingelement2009.sfplanning.org/docs/Housing_Element_Part_I_4.22.09.pdf (accessed August 27, 2009).

housing goals, 52 percent of its Low Income goals, 13 percent of its Moderate Income goals, and 153 percent of its Above Moderate Income (market-rate) housing goals.

The distribution of future housing units needed by income level in San Francisco during the 2007–2014 period is shown in Table III.C-4 (San Francisco Housing Need, 2007–2014), below.

Table III.C-4 San Francisco Housing Need, 2007–2014

Income Group	*Number of Units*
Very low	6,589
Low	5,535
Moderate	6,754
Above moderate	12,315
Total	***31,193***

SOURCE: ABAG, *San Francisco Bay Area Housing Needs Plan, 2007 to 2014*, 2008.

San Francisco Citywide Affordable Housing Program

The San Francisco Redevelopment Agency's Citywide Tax Increment Housing Program (Housing Program) dedicates a portion of the tax increment generated through the Agency's real estate activities to the development of affordable housing. By state law, the Agency must expend at least 20 percent of its tax increment financing for the construction or preservation of affordable housing. The Agency also must produce affordable housing totaling at least 15 percent of all new units within the Redevelopment Project Areas. The Agency sets maximum incomes for all affordable units, which can vary from unit to unit and from location to location. The income limits are adjusted each year based on data provided by HUD.

Through the Housing Program, tax increment funds are committed as grants and loans to non-profit and for-profit housing organizations for the development of a range of affordable housing for San Francisco residents. Funds are committed at all stages of project development, from predevelopment, acquisition, construction, rehabilitation, to permanent financing.

The Housing Program has been in place since 1990, and is now concluding over 19 years of activity. During this period, over $428 million has been committed to creating approximately 9,628 housing units for low- and moderate-income families and individuals throughout San Francisco. Housing Program funds are generated within redevelopment project areas, but are invested in affordable housing development throughout the City, both within and outside of redevelopment project areas. Approximately half of the housing units developed under the Housing Program have been created through new construction and approximately half through rehabilitation of existing structures. Over 60 percent are family apartments and single-room occupancy residential hotels; the remainder is special needs housing and emergency shelters, as well as transitional facilities.

Project Site

As previously mentioned, the existing population and household data for the Project site are taken from 2005 data from San Francisco County Transportation Authority, *TAZ Model Data (*2008), which includes units within the TAZ boundary, but outside of the Candlestick Point site. As of 2005, there were

approximately 298 existing housing units within the TAZ boundary, as shown in Table III.C-1; however, six are vacant, resulting in a total of 292 occupied households. There are 256 existing units within the Candlestick Point portion of the Project site, all of which are associated with the Alice Griffith Housing Project. For purposes of the EIR analysis, it is assumed that 256 households are located within the Candlestick Point portion of the Project site.

The housing characteristics of the Bayview Hunters Point neighborhood differ from those of San Francisco as a whole, particularly within the Project site (including Candlestick Point and HPS Phase II). The 2000 Census, the most recent comprehensive study of housing characteristics by neighborhood,[77] reported that the Project site had a higher proportion of rental units (74 percent versus 62 percent), lower vacancy rates (1.3 percent versus 4.9 percent), and more persons per household (3.8 versus the 2.3 citywide average).[78]

Employment

Regional Overview

The Bay Area is a major employment center, with over 3.2 million jobs reported in 2005.[79] A large percentage of this employment is in San Francisco. As shown in Table III.C-5 (Existing Employment [2005]), there were approximately 553,090 jobs in the City in 2005, approximately 17 percent of the total regional employment.

At the time of the 2000 Census, about 55 percent of the workers holding jobs in San Francisco lived in the City, while the remaining 45 percent lived in other jurisdictions.[80] For this reason, the daytime population associated with local employment substantially exceeds the residential (nighttime) population. Estimated City employment for 2030 would be approximately 748,100 jobs.[81]

Project Site

Table III.C-5 presents existing employment estimates for the Project site. Existing employment at Candlestick Point is minimal, generally associated with temporary stadium staffing, property management, and oversight of the CPSRA. Employment at HPS Phase II includes professional artists, security, and environmental cleanup staff. In total, there are approximately 529 full-time equivalent staff at the Project site.

[77] Comprehensive 2005 data pertaining to housing characteristics is not available at this time.
[78] San Francisco County Transportation Authority, 2008. *TAZ Model Data* (derived from US Census Bureau, *Census 2000*, Summary File 1, Tables H3 and H5, 2000).
[79] Association of Bay Area Governments, *Projections 2007,* 2006.
[80] US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006. It should be noted that a certain percentage of San Francisco residents also commute to other communities.
[81] Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009. This number includes employment projections associated with the Project.

Table III.C-5 Existing Employment (2005)	
Analysis Area	***Total***
Candlestick Point [a,b]	213
HPS Phase II [a,c]	316
Project Site Total	***529***
San Francisco[d,e]	553,090
San Mateo County[f]	337,350

SOURCES:

a. Data for the Project site was derived from San Francisco County Transportation Authority, *TAZ Model Data*, 2008.
b. Existing jobs at Candlestick Point include property management, oversight of the CPSRA, and part-time service jobs associated with Candlestick Park. The totals assume that there are 20 events a year at the stadium and employees work approximately 6 hours per shift. Jobs at Candlestick Point are reported in full-time equivalent (FTE) numbers.
c. Jobs at HPS Phase II include contract and temporary jobs associated with cleanup activities, security, and approximately 300 professional artists. Jobs at HPS Phase II are reported in full-time equivalent (FTE) numbers.
d. The employment total for San Francisco is 2005 data from Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009.
e. By 2008, the number of jobs in the City rose to 576,917 according to Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point–Hunters Point Shipyard Redevelopment Project*, 2009.
f. The employment total for San Mateo County is 2005 data from ABAG, *Projections 2007*, 2006.

III.C.3 Regulatory Framework

Federal

There are no federal population, housing, and employment regulations applicable to the Project.

State

There are no State population, housing, and employment regulations applicable to the Project.

Regional

There are no regional population, housing, and employment regulations applicable to the Project.

Local

San Francisco Housing Element

The 2004 Housing Element update was adopted by the San Francisco Planning Commission on May 13, 2004, and found in compliance with state housing element requirements by HCD in October of 2004. Subsequent to adoption of the 2004 Housing Element, the California Court of Appeals found that the Negative Declaration prepared in support of the 2004 Housing Element was inadequate and required the preparation of an Environmental Impact Report. Under the terms of the Writ of Mandate issued by the San Francisco Superior Court, the City may rely on the 2004 Housing Element, minus policies, objectives,

and implementation measures that were stricken as a result of the lawsuit. Such policies cannot be adopted until completion of the EIR. As required by state law, San Francisco is due for its next five-year Housing Element Update, and the Planning Department has prepared a Draft 2009 Housing Element for environmental review. In an effort to comply with the court order requiring an EIR for the 2004 Housing Element and to review the updated draft 2009 Housing Element pursuant to CEQA, the City is preparing an EIR to identify the environmental impacts resulting from the proposed objectives, policies, and implementation measures identified as part of the 2004 Housing Element Update and the draft 2009 Housing Element Update at an equal level of detail. The 2004 Housing Element, as modified by the Superior Court, contains objectives and policies that are relevant to the Project as follows:

Objective 1 To provide new housing, especially permanently affordable housing, in appropriate locations which meets identified housing needs and takes into account the demand for affordable housing created by employment demand.

- Policy 1.1 Encourage higher residential density in areas adjacent to downtown, in underutilized commercial and industrial areas proposed for conversion to housing, and in neighborhood commercial districts where higher density will not have harmful effects, especially if the higher density provides a significant number of units that are affordable to lower income households.
- Policy 1.3 Identify opportunities for housing and mixed-use districts near downtown and former industrial portions of the City.
- Policy 1.4 Locate in-fill housing on appropriate sites in established residential neighborhoods.
- Policy 1.5 Support development of affordable housing on surplus public lands.
- Policy 1.6 Create incentives for the inclusion of housing, particularly permanently affordable housing, in new commercial development projects.
- Policy 1.7 Encourage and support the construction of quality, new family housing.
- Policy 1.8 Allow new secondary units in areas where their effects can be dealt with and there is neighborhood support, especially if that housing is made permanently affordable to lower-income households.
- Policy 1.9 Require new commercial developments and higher educational institutions to meet the housing demand they generate, particularly the need for affordable housing for lower income workers and students.

Objective 2 Retain the existing supply of housing.

- Policy 3.3 Maintain and improve the condition of the existing supply of public housing.

Objective 4	Support affordable housing production by increasing site availability and capacity.	
	Policy 4.1	Actively identify and pursue opportunity sites for permanently affordable housing.
	Policy 4.2	Include affordable units in larger housing projects.
Objective 8	Ensure equal access to housing opportunities.	
	Policy 8.1	Encourage sufficient and suitable rental housing opportunities and emphasize permanently affordable rental units wherever possible.
	Policy 8.4	Encourage greater economic integration within housing projects and throughout San Francisco.
	Policy 8.9	Encourage the provision of new home ownership opportunities through new construction so that increased owner occupancy does not diminish the supply of rental housing.
Objective 9	Avoid or mitigate hardships imposed by displacement.	
	Policy 9.1	Minimize the hardships of displacement by providing essential relocation services.
	Policy 9.2	Offer displaced households the right of first refusal to occupy replacement housing units that are comparable in size, location, cost, and rent control protection.
Objective 11	In increasing the supply of housing, pursue place making and neighborhood building principles and practices to maintain San Francisco's desirable urban fabric and enhance livability in all neighborhoods.	
	Policy 11.1	Use new housing development as a means to enhance neighborhood vitality and diversity.
	Policy 11.2	Ensure housing is provided with adequate public improvements, services, and amenities.
	Policy 11.3	Encourage appropriate neighborhood-serving commercial activities in residential areas, without causing affordable housing displacement.
	Policy 11.5	Promote the construction of well-designed housing that enhances existing neighborhood character.
	Policy 11.8	Strongly encourage housing project sponsors to take full advantage of allowable building densities in their housing developments while remaining consistent with neighborhood character.
	Policy 11.9	Set allowable densities and parking standards in residential areas at levels that promote the City's overall housing objectives while respecting neighborhood scale and character.
	Policy 12.2	Support the production of well-planned housing regionwide that address regional housing needs and improve the overall quality of life in the Bay Area.

III.C.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to population, employment, and housing, but generally consider that implementation of the Project would have significant impacts if it were to:

C.a Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)

C.b Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing elsewhere

C.c Displace substantial number of people, necessitating the construction of replacement housing elsewhere

Analytic Method

The analysis compares the population, housing, and employment that would result from implementation of the Project to existing conditions, which is defined as conditions in 2005. The 2005 data are used to represent baseline conditions because 2005 data are the most current data consistently available for the Project site across all population, employment, and housing indices. Table III.C-6 (Project Housing Units and Population) through Table III.C-8 (Project Construction Employment) provide the projected population, housing, and employment characteristics of the Project. The population, housing, and employment that would result from implementation of the Project are also compared against 2030 projections, either the latest year for which projections have been formulated or the closest year to Project build-out for projections which extend in 5-year increments beyond 2030.

Table III.C-6 Project Housing Units and Population

Analysis Area	*Total Housing Units/Households*	*Total Population*
Candlestick Point	7,850	18,290
HPS Phase II	2,650	6,175
Project Site Total	***10,500***	***24,465[a]***

SOURCE: Lennar Urban 2009; Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project*, 2009.

a. The population is calculated as 2.33 persons per unit, and it is assumed that all units are fully occupied.

Table III.C-7 Project Employment by Land Use

Land Use	*Employment Factor*[a]	*Development Program, Candlestick Point*[b]	*Employment, Candlestick Point (jobs)*	*Development Program, HPS Phase II*[b]	*Employment, HPS Phase II (jobs)*	*Total Employment (jobs)*
Residential	25 units/job	7,850 units	314	2,650 units	106	420
Regional Retail	350 gsf/job	635,000 gsf	1,814	0 gsf	—	1,814
Neighborhood Retail	270 gsf/job	125,000 gsf	463	125,000 gsf	463	926
Office	276 gsf/job	150,000 gsf	543	0 gsf	—	543
Research and Development	400 gsf/job	0 gsf	—	2,500,000 gsf	6,250	6,250
Hotel	700 gsf/job	150,000 gsf	214	0 gsf	—	214
Football Stadium	2,915 jobs/event[c]	0 events[c]	—	32 events/year[c]	359	359
Arena/Performance Venue	300 jobs/event[d]	150 events/year[d]	87	0 events[d]	—	87
Public Parking	270 spaces/job[e]	3,806[f]	16	4,711	16	32
Parks and Open Space	0.26 jobs/acre[g]	104.8[h]	27	231.6	60	87
Total			***3,478***		***7,254***	***10,730***

SOURCES: Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project*, 2009.

a. Employment factors are from City and County of San Francisco, *Transportation Impact Analysis Guidelines*, October 2002.

b. Based on buildout floor areas provided in Table II-2 of this EIR, Chapter II (Project Description).

c. Based on data provided by the 49ers. The employment projections are based on 12 football games and 20 additional events annually and 8-hour work shifts. The total excludes media jobs. A full-time equivalent is equal to 2,080 hours per year.

d. Lennar Urban, LLC estimates that there would be approximately 150 events at the arena annually and that employees would work 4-hour shifts.

e. Employment factors for public parking facilities provided by Economic and Planning Systems, Inc., 2009.

f. Parking based on Table II-2 of this EIR, Chapter II (Project Description). Includes Commercial (structured) and General and Commercial (on street).

g. Employment factors for parks and open space provided by Economic and Planning Systems, Inc., 2009.

h. Open space acreages based on Table II-2 of this EIR, Chapter II (Project Description).

Table III.C-8 Project Construction Employment

	Candlestick Point		*HPS Phase II*		*Combined*	
Year	*Max. Number of Daily Workers*	*Avg. Number of Daily Workers*	*Max. Number of Daily Workers*	*Avg. Number of Daily Workers*	*Max. Number of Daily Workers*	*Avg. Number of Daily Workers*
2011	0	0	95	76	95	76
2012	0	0	83	66	83	66
2013	93	74	130	104	223	178
2014	158	126	205	152	363	278
2015	163	130	455	364	617	494
2016	163	130	446	358	609	488
2017	163	130	278	227	440	357
2018	176	139	280	227	456	366
2019	218	174	253	202	470	376
2020	218	174	243	194	460	368
2021	115	92	143	114	258	206
2022	255	203	189	152	443	355
2023	285	228	149	120	434	348
2024	235	187	60	48	295	235
2025	208	166	56	46	264	212
2026	155	133	123	102	278	235
2027	162	129	73	58	235	187
2028	282	225	38	30	320	255
2029	328	262	20	16	348	278
2030	163	130	33	26	195	156
2031	70	56	15	12	85	68

SOURCE: MACTEC, 2010.

a. Construction employment includes on-site construction, off-site roadway improvements, field management, and shoreline improvements.

The analysis considers whether the Project would contribute to substantial daytime and/or residential population growth. "Substantial" growth is defined as increases in population that are unplanned, without consideration of or planning for infrastructure, services, and housing needed to support proposed residents, employees, and visitors. As a result of the Project, direct and indirect growth would result at the Project site and in the surrounding Bayview Hunters Point neighborhood. Direct population growth at Candlestick Point would include the residents and employees who would occupy the new homes and businesses developed at the Project site, as well as temporary construction employment. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to or near undeveloped lands.

The analysis also considers whether the Project would displace substantial numbers of residents or housing units. This analysis considers both temporary (construction-related) displacement, as well as permanent

displacement. Displacement of residents would be considered to occur if residents were forced to leave their homes without being provided with temporary housing, monetary compensation, or some other form of mitigation to help with the relocation process and if they were not given the right to return. Displacement of housing units would occur if housing units were demolished and replaced with an alternative land use.

Additionally, the Project's potential contribution to cumulative population, housing, and employment impacts are evaluated in the context of existing, proposed, and reasonably foreseeable future development expected in the City.

Construction Impacts

Impact PH-1: Population Growth

Impact PH-1 **Construction of the Project would not induce substantial direct population growth. (Less than Significant) *[Criterion C.a]***

There would be direct, but temporary, construction job growth at the Project site as a result of the Project. Table III.C-8 shows the average and maximum number of construction workers that would be employed during the construction period on a daily basis. Peak construction employment would occur in 2029 for Candlestick Point, with an average of 262 and a maximum of 328 workers on site in 2029. Peak construction employment for HPS Phase II would occur in 2015. During 2015, an average of 364 workers and a maximum of 455 construction workers would be employed at HPS Phase II in 2015 during the construction period.

It is anticipated that construction employees not already living in the Bayview Hunters Point neighborhood would commute from elsewhere in the Bay Area rather than relocate to the Bayview Hunters Point neighborhood for a temporary construction assignment, and construction hiring policies associated with this Project would aim to maximize hiring among local residents. Thus, development of the Project would not generate a substantial, unplanned population increase. Impacts associated with construction employment would be less than significant. No mitigation is required.

Operational impacts

Impact PH-2: Population Growth

Impact of Candlestick Point

Impact PH-2a **Operation of Candlestick Point would not induce substantial direct or indirect population growth. (Less than Significant) *[Criterion C.a]***

Direct Growth

As shown in Table III.C-6, the Project would develop approximately 10,500 housing units, of which 7,850 (approximately 75 percent) would be at Candlestick Point. Based on an average household size of 2.3 persons per unit and full occupancy of all units, population at Candlestick Point would be approximately 18,290 residents at full occupancy in 2032. The Project would also include development of new

commercial, industrial, R&D/office, and retail uses, resulting in employment of 3,478 jobs at Candlestick Point (refer to Table III.C-7). In total, the population at Candlestick Point would represent approximately 2.0 percent of the citywide population of 916,800 in 2030, while employment would represent 0.5 percent of the 748,100 jobs in 2030.

Although the Project would result in an increase in population and employment at Candlestick Point, growth in this area has long been the subject of many planning activities. The primary objective of the Project is to provide new housing and non-residential uses in support of planned redevelopment. Planning activities pertaining to Candlestick Point date to 1969, with initial adoption of the BVHP Redevelopment Plan. As discussed in Chapter I, development of Candlestick Point was also anticipated in the BVHP Area Plan, and in a series of initiatives approved by San Francisco voters (Propositions D, E and G).[82,83] The BVHP Redevelopment Plan was updated in 2005 and 2006, and uses planned for HPS Phase I under the BVHP Redevelopment Plan are currently under construction. The Project, as proposed, was developed based on the land uses, number of housing units (10,000 units total at HPS Phase II and Candlestick Point), and objectives approved by voters under Proposition G in 2008. In summary, the uses provided as part of the Project support planned growth at the Project site.

As a result of these ongoing planning activities, City service providers have been aware of, and have included future growth projections for Candlestick Point, in their long-term operations plans. Planning department population projections[84] include the population growth associated with the Project and are the basis of the San Francisco Public Utilities Commission's *Water Supply Availability Study*. In addition, the Southeast Water Pollution Control Plant has capacity to treat wastewater from the Project site.[85] The Project would provide all on-site infrastructure for connections to City mains, and would include on-site treatment of stormwater runoff. Refer to Section II.D (Project Objectives), Section III.O (Public Services), Section III.P (Recreation), Section III.Q (Utilities), and Section III.R (Energy) for further description of the Project's potential impacts on infrastructure and services. In summary, the infrastructure needed to support the level of growth anticipated under the Project was planned based on population projections that included the housing and employment associated with the Project.

Employment growth at Candlestick Point would also be considered substantial if it resulted in housing demand that would exceed planned regional housing development. Table III.C-9 (Project Housing Demand) estimates the number of housing units that would be needed to provide housing for employees of jobs created as a result of the Project. These calculations were derived from existing Census Bureau employment and U.S Department of Transportation commuting pattern data.[86] The average household would be expected to have 1.36 workers. This rate is based on the Planning Department's projection of the number of workers in the average City household in 2025 (no 2030 forecast data are available)[87]. Utilizing the rate of 1.36 workers per dwelling unit, the Project, with a total employment of 10,730 workers, would require 0.74 housing units per worker (calculated as 1 dwelling unit/1.36 workers equals the number

[82] Candlestick Point is outside the boundaries of the HPS Redevelopment Plan.
[83] Proposition G repealed Propositions D and F.
[84] Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009.
[85] San Francisco Public Utilities Commission, Sewer System, 2009.
[86] Census Bureau, 2009; US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006.
[87] San Francisco, General Plan Housing Element, Table I-14, 2004.

of dwelling units per worker, which is 0.74). Table III.C-9 assumes that approximately 55 percent of the workers would seek housing in the City, consistent with existing commuting patterns.[88] The calculations also assume a vacancy rate of 4.7 percent,[89] which requires an add-on demand to account for the vacancy rate (see footnotes c and d in Table III.C-9, below). Based on these assumptions, the development at Candlestick Point would result in a total demand for 2,677 housing units based on employee demand. A total of 7,850 units would be provided at Candlestick Point, although 10,500 units would be provided within the entire Project site.[90]

Table III.C-9 Project Housing Demand

Analysis Area	*Project Employment[a,b]*	*Project Housing Demand, San Francisco[c]*	*Project Housing Demand, Other Communities[d]*	*Total Demand*	*Project Housing[e]*
Candlestick Point	3,476	1,472	1,205	2,677	7,850
HPS Phase II	7,254	3,072	2,514	5,586	2,650
Project Site Total	***10,730***	***4,544***	***3,719***	***8,263***	***10,500***

a. Does not include existing employment.
b. Project employment data are derived from Table III.C-7.
c. Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.
d. Based on existing commuting patterns, housing demand in other communities is estimated to be 45% of total housing demand; calculated as projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 45% total demand in other communities.
e. Employment projections are provided in Table III.C-6.

Total demand for housing at Candlestick Point would represent 1.2 percent of the total Bay Area housing need of 214,500 units (based on the RHNA targets; refer to Section III.C.2 [Setting]) projected by ABAG through 2014.[91] While the population increase associated with employment at Candlestick Point could be entirely accommodated at the Project site, it is likely that employees of the Project would elect to live elsewhere in the City or within surrounding Bay Area communities.

Based on existing commuting patterns, approximately 1,472 housing units would be required in San Francisco to meet anticipated housing demand. The 7,850 housing units that would be developed at Candlestick Point would exceed the total demand for new units within the City generated by employment at Candlestick Point. Given that a broad range of housing options of varying sizes, types, and levels of affordability would be developed at Candlestick Point and that such housing would be in close proximity to the jobs provided by the Project, it is likely that future employees at Candlestick Point would seek housing at the Project site prior to searching for housing in the surrounding Bayview Hunters Point neighborhood. However, if future employees did seek housing elsewhere in the neighborhood, the effects

[88] This assumption provides a conservative estimate of the housing demand that the Project would generate in other Bay Area communities, such as nearby cities in San Mateo County. Information pertaining to commuting trends was derived from US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006.
[89] This rate is based on California Department of Finance, January 2008 Projections.
[90] It should be noted that one of the Project objectives is to provide employment opportunities for existing residents in the Bayview Hunters Point neighborhood; thus, it is anticipated that some of the future employees at Candlestick Point would include residents already living in the neighborhood. Although total housing demand could include existing households, this analysis conservatively assumes that all housing demand generated by the Project would need to be accommodated by new units.
[91] The RHNP is updated every five years and does not extend through 2030.

would not be adverse. As stated on p. 8 of the BVHP Redevelopment Plan, future development in the Bayview Hunters Point neighborhood should:

> Eliminat[e] blighting influences and correct environmental deficiencies within the Project Area, including, but not limited to, abnormally high vacancies, abandoned, deteriorated and dilapidated buildings, incompatible land uses, depreciated or stagnant property values, and inadequate or deteriorated public improvements, facilities and utilities. [92]

Persons associated with the Project seeking housing within the Bayview Hunters Point neighborhood would help to reduce the excessive vacancies identified by the BVHP Redevelopment Plan. Moreover, the housing provided at Candlestick Point would also be available to existing residents of the Bayview Hunters Point neighborhood should existing residents wish to relocate to the Project site.

A percentage of the persons employed at Candlestick Point would also be expected to commute to other communities outside of the City for various personal and socioeconomic reasons, for example, to accommodate the employment of a spouse or to maintain existing community relationships. Based on existing commuting patterns, demand for about 1,205 units would be generated in surrounding Bay Area communities by Candlestick Point development. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

Employment at Candlestick Point would not create a substantial demand for housing in the Bayview Hunters Point neighborhood, San Francisco, or the region in excess of the housing provided as part of the Project or the housing otherwise available in the Bay Area. The amount of housing provided by the Project would exceed demand generated by employees of the Project. To summarize, the need for infrastructure, public services, and housing associated with direct population growth proposed at Candlestick Point has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant for Candlestick Point. No mitigation is required.

Indirect Growth

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be a potential for the development at Candlestick Point to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the Project site are built out, except for sites such as Executive Park or India Basin Shoreline that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve Candlestick Point, without significant excess capacity that might encourage additional local growth beyond that already planned for under Proposition G and under the redevelopment plans. The development at Candlestick Point would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant for Candlestick Point. No mitigation is required.

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[92] City and County of San Francisco, Redevelopment Agency, *Bayview Hunters Point Redevelopment Plan,* p. 8, 2006.

Impact of Hunters Point Shipyard Phase II

Impact PH-2b Operation of HPS Phase II would not induce substantial direct or indirect population growth. (Less than Significant) *[Criterion C.a]*

Direct Growth

Direct population growth at HPS Phase II would include the residents and employees who would occupy the new homes and businesses developed at this site. As shown in Table III.C-6, 2,650 housing units (approximately 25 percent of the Project total) would be at HPS Phase II. The population at HPS Phase II would be approximately 6,175 residents at full occupancy in 2032. The Project would also include development of new commercial, industrial, R&D/office, and retail uses, resulting in employment of 7,252 jobs at HPS Phase II (refer to Table III.C-7). In total, the population at HPS Phase II would represent approximately 0.7 percent of the citywide population of 916,800 in 2030, while employment would represent 1.0 percent of the 748,100 jobs in 2030.

Although the Project would result in an increase in population and employment at HPS Phase II, growth in this area has long been the subject of many planning activities. The primary objective of the Project is to provide new housing and non-residential uses in support of planned redevelopment. Planning activities pertaining to HPS Phase II date to 1969, preceding closure of the HPS naval shipyard. As discussed in Chapter I, development of HPS Phase II was anticipated in the HPS Redevelopment Plan and in an initiative approved by San Francisco voters (Proposition G).[93,94] Uses planned for HPS Phase I under the HPS Redevelopment Plan are currently under construction. The Project, as proposed, was developed based on the land uses, number of housing units (approximately 10,000 units total at HPS Phase II and Candlestick Point), and objectives approved by voters under Proposition G in 2008 (Project Objectives are outlined in Section II.D). In summary, the uses provided as part of the Project support planned growth at the Project site.

As a result of these ongoing planning activities, City service providers have been aware of, and have included future growth projections for HPS Phase II, in their long-term operations plans. Planning department population projections[95] include the population growth associated with the Project and are the basis of the San Francisco Public Utilities Commission's *Water Supply Availability Study*. In addition, the Southeast Water Pollution Control Plant has capacity to treat wastewater from the Project site.[96] The Project would provide all on-site infrastructure for connections to City mains, and would include on-site treatment of stormwater runoff. Refer to Section III.O, Section III.P, Section III.Q, and Section III.R for further description of the Project's potential impacts on infrastructure and services. In summary, the infrastructure needed to support the level of growth anticipated under the Project was planned based on population projections that included the housing and employment associated with the Project.

Employment growth at HPS Phase II would also be considered substantial if it resulted in housing demand that would exceed planned regional housing development. Table III.C-9 estimates the number of housing

[93] The HPS Phase II site is outside the boundaries of the BVHP Redevelopment Plan and BVHP Area Plan.
[94] Proposition G repealed Propositions D and F.
[95] Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030,* July 9, 2009.
[96] San Francisco Public Utilities Commission, 2009.

units that would be needed to provide housing for employees of jobs created as a result of the Project. The average household would be expected to have 1.36 workers, resulting in a need for 0.74 housing units per worker.[97] Table III.C-9 indicates that approximately 55 percent of the workers would seek housing in the City, consistent with existing commuting patterns.[98] The calculations also assume a vacancy rate of 4.7 percent.[99] Based on these assumptions, the development at HPS Phase II would result in a total demand for 5,586 housing units as a result of employment at HPS Phase II.[100]

Total demand for housing at HPS Phase II would represent 2.6 percent of the total Bay Area housing need of 214,500 units (based on the RHNA targets; refer to Section III.C.2) projected by ABAG through 2014.[101] While the population increase associated with employment at HPS Phase II could be entirely accommodated at the Project site, it is likely that employees of the Project would elect to live elsewhere in the City or within surrounding Bay Area communities.

Based on existing commuting patterns, approximately 3,072 housing units would be required in San Francisco to meet anticipated housing demand. The 2,650 housing units that would be developed at HPS Phase II would be less than the total demand for new units generated by employment at HPS Phase II; however, units being constructed at HPS Phase I and at Candlestick Point would offset HPS Phase II housing demand. Given that a broad range of housing options of varying sizes, types, and levels of affordability would be developed at HPS Phase I, HPS Phase II, and Candlestick Point, and such housing would be in close proximity to the jobs provided by the Project, it is likely that future employees at HPS Phase II would seek housing at the Project site prior to searching for housing in the surrounding Bayview Hunters Point neighborhood. However, if future employees did seek housing elsewhere in the neighborhood, the effects would not be adverse. Employees of HPS Phase II businesses seeking housing within the Bayview Hunters Point neighborhood would help to reduce the excessive vacancies identified by the BVHP Redevelopment Plan. Moreover, the housing provided at HPS Phase II would also be available to existing residents of the Bayview Hunters Point neighborhood should existing residents wish to relocate to the Project site.

A percentage of the persons employed at HPS Phase II would also be expected to commute to other communities outside of the City for various personal and socioeconomic reasons. Based on existing commuting patterns, the demand for about 2,514 units would be generated in surrounding Bay Area communities by HPS Phase II development. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

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[97] Households per worker = 1 household/ 1.36 workers. This rate is based on the Planning Department's projection of the number of workers in the average City household in 2025 (no 2030 forecast data are available). San Francisco, General Plan Housing Element, Table I-14, 2004.

[98] This assumption provides a conservative estimate of the housing demand that the Project would generate in other Bay Area communities, such as nearby cities in San Mateo County. Information pertaining to commuting trends was derived from US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006.

[99] This rate is based on California Department of Finance, January 2008 Projections.

[100] It should be noted that one of the Project objectives is to provide employment opportunities for existing residents in the Bayview Hunters Point neighborhood; thus, it is anticipated that some of the future employees at HPS Phase II would include residents already living in the neighborhood. Although total housing demand could include existing households, this analysis conservatively assumes that all housing demand generated by the Project would need to be accommodated by new units.

[101] The RHNP is updated every five years and does not extend through 2030.

It is not anticipated that employment at HPS Phase II would create a substantial demand for housing in the Bayview Hunters Point neighborhood, San Francisco, or the region in excess of the housing provided as part of the Project or the housing otherwise available in the Bay Area. To summarize, the need for infrastructure, public services, and housing associated with direct population growth proposed at HPS Phase II has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant for HPS Phase II. No mitigation is required.

Indirect Growth

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be a potential for the development at HPS Phase II to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served or underserved areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the Project site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve HPS Phase II, without significant excess capacity that might encourage additional local growth beyond that already planned for under Proposition G and under the redevelopment plans. The development at HPS Phase II would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant for HPS Phase II. No mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact PH-2 Operation of the Project would not induce substantial direct or indirect population growth. (Less than Significant) *[Criterion C.a]*

The Project would develop 7,850 housing units at Candlestick Point and 2,650 units at HPS Phase II, a total of 10,500 residential units. The demand for 8,263 housing units that would be generated by the Project would be less than the total number of units provided by the Project.

The demand for housing units outside of San Francisco, conservatively assuming that 45 percent of those employed at the Project site would commute from outside of San Francisco, would be dispersed throughout the nine-county Bay Area.[102] In addition, any potential Project-related increase in housing demand in the surrounding Bayview Hunters Point neighborhood would help to fill the existing and abnormally high vacancies in the neighborhood that contribute to conditions of economic blight. The Project would provide more housing units than the demand it would generate. Therefore, the Project would create a substantial demand for housing in the Bayview Hunters Point neighborhood, San Francisco, or the region in excess of the total number of housing units provided as part of the Project.

The Project would provide infrastructure and services that would meet the needs of the residents and employees generated at the site. However, the infrastructure would not extend to previously un-served areas, allowing indirect population growth. The jobs and housing units that would be provided at the

[102] Refer to the discussion of commuting patterns in Section III.D (Transportation and Circulation).

Project site would be closely balanced (approximately 10,730 jobs and 10,500 housing units) so that neither a surplus of housing or jobs would occur, resulting in indirect residential or employment growth. As a result, the population and employment increase associated with the Project would not be substantial. The Project impact is considered less than significant. No mitigation is required.

Impact PH-3: Residential Displacement

Impact of Candlestick Point

Impact PH-3a **Implementation of the Project would not displace existing housing units and residents at Candlestick Point, necessitating the construction of new units elsewhere. (No Impact)** ***[Criteria C.b and C.c]***

The Project would demolish and replace 256 units at the Alice Griffith public housing site. There are no other housing units or residents on the Project site. Redevelopment of the Alice Griffith site would proceed in phases and would not displace existing residents. The initial phases would develop currently vacant portions of the Alice Griffith site, and existing residents would then occupy replacement public housing units before existing structures would be demolished in subsequent phases. Overall, the Project would develop a total of 1,210 units of public housing, affordable housing, below-market rate housing, and market-rate housing in the Alice Griffith district, and 3,345 units of public housing, affordable housing, and below-market rate housing overall.

Because the Project would not displace existing housing units or residents that would necessitate the construction of new units elsewhere, beyond the units already provided as part of the Project, there would be no impact. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact PH-3b **Implementation of the Project would not displace existing housing units or residents at HPS Phase II, necessitating the construction of new units elsewhere. (No Impact)** ***[Criteria C.b and C.c]***

There are no existing housing units at HPS Phase II. Therefore, build-out of the Project would not replace housing units with new uses, and no existing residents would be displaced. The Project would create demand for housing; however, as discussed under Impact PH-2b, such demand would not be substantial and could be accommodated by housing provided as part of the Project. Because there would be no residential displacement at HPS Phase II, development of the Project would have no impact on displacement of housing and residents at this site. No mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact PH-3 **The Project would not displace existing housing units or residents, necessitating the construction of new units elsewhere. (No Impact)** ***[Criteria C.b and C.c]***

As discussed under Impact PH-3a, the Project would demolish and replace 256 units at the Alice Griffith public housing site. The Project would not displace existing housing units or residents that would necessitate the construction of new units elsewhere, beyond the units already provided as part of the

Project. Further, as discussed in Impact PH-3b, there are no existing housing units at HPS Phase II. Therefore, build-out of the Project would not replace housing units with new uses, and no existing residents would be displaced. Development of the Project would have no impact on displacement of housing and residents. No mitigation is required.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts to population and housing is the City and County of San Francisco. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process. The geographic context for an analysis of cumulative impacts to employment would include the entire Bay Area (as represented by the ABAG Planning Area), since a substantial percentage of City population commutes to jobs outside City limits, and substantial numbers of residents of other cities in the Bay Area commute to jobs within the City. The existing employment conditions, representing past and present development in this geographic area, are presented in the setting description of regional employment.

The Planning Department routinely prepares projections for the purposes of analyzing impacts of plans and projects undergoing the environmental review process. The Planning Department recently developed projections for citywide growth expectations by 2030.[103] The projections also specifically took into account projects currently in various stages of the entitlement process, as well as Treasure Island, Park Merced projects, and the Project, the latter of which is being analyzed in this EIR. Development projections estimate an increase in 61,814 households, 133,359 persons, and 195,010 jobs from 2005 to 2030.

Population and Housing

Development of cumulative projects in the City and County of San Francisco would result in an increase in population, housing, and employment. As long as the cumulative project scenario generates cumulative population, housing, and employment conditions that are within the projections formulated by the Planning Department by 2030 and meet their share of the RHND, there would be no significant adverse impact to population, housing, and employment.

As noted, above, "substantial" growth is defined as increases in population that are unplanned, without consideration of or planning for infrastructure, services, and housing needed to support proposed residents, employees, and visitors. Development of cumulative projects could result in increases in population. Population projections estimate an increase in 133,359 City residents between 2005 and 2030, an overall increase of 17.0 percent, or approximately 0.7 percent per year. Subtracting the population increase associated with the Project, as this number has been included in the overall population projections, cumulative projects could account for up to 108,894 persons and fall within the City's projections. It is possible that cumulative projects could result in localized changes in zoning or land uses that could result in substantial direct or indirect population growth and an exceedance of City population projections. Such an impact, however, is not likely for several reasons. First, during the process of considering such projects,

[103] Correspondence from John Rahaim, Director of Planning, to SFPUC, July 9, 2009.

the City would be required to prepare an environmental review pursuant to CEQA, identify any infrastructure or service-related significant impacts and provide mitigation. Second, the City is largely built and there are few opportunities for unplanned changes in zoning or land use that would cause substantial growth. Third, the City and Agency actively engage in long-range planning efforts throughout the City, such that population growth would occur in the context of these planning activities that would consider infrastructure, public services, and housing needs. Consequently, there is no anticipated significant cumulative impact associated with population and housing growth.

Direct population growth associated with the Project would be considered "planned" growth, since this Project has been considered in the City's population planning projections. In total, the Project would represent 18.3 percent of the projected population growth in the City between 2005 and 2030. Indirect growth would include residential and employment growth in surrounding neighborhoods resulting from the expansion of infrastructure and services proposed under the Project. As stated above, such growth would only be considered substantial if it were not anticipated in local planning efforts. Infrastructure and services would be expanded to serve the Project, without significant excess capacity that might encourage additional local growth beyond that already planned for under Proposition G and under the redevelopment plans. Because this population growth has been accounted for in City projections, it would not be considered substantial. Therefore, the Project would not make a cumulatively considerable contribution to any potential cumulative impact related to substantial increases in population, and the Project's cumulative impact would be less than significant.

Housing need as identified in the 2007–2014 Housing Element Update is 31,193 units; the Project would provide approximately 10,500 dwelling units, or over one-third of the City's portion of the regional housing need. As noted in Setting, above, over the course of the past several decades, the construction of housing in the region has failed to keep pace with population growth in the Bay Area. Although population growth has slowed and is predicted to continue at a relatively moderate rate through 2030, the region is still attempting to make up for housing shortages from previous growth periods. The demand for 8,263 housing units that would be generated by the Project would be less than the total number of units provided by the Project. The Project would provide a benefit to the region by constructing more housing than the demand it would generate, helping to achieve a better jobs/housing balance in the Bay Area.

The demand for housing units outside of the City, conservatively assuming that 45 percent of those employed at the Project site would commute from outside of San Francisco, would be dispersed throughout the nine-county Bay Area.[104] In addition, any potential Project-related increase in housing demand in the surrounding Bayview Hunters Point neighborhood would help to fill the existing and abnormally high vacancies in the neighborhood that contribute to conditions of economic blight. The Project would not create a substantial demand for housing in the Bayview Hunters Point neighborhood, San Francisco, or the region in excess of the total number of housing units provided as part of the Project.

The Project's contribution to the significant cumulative housing shortage in the Bay Area would not be cumulatively considerable because it would provide more housing than is required by Project demand. The Project's cumulative impact would be less than significant.

[104] Refer to the discussion of commuting patterns in Section III.D (Transportation and Circulation).

Employment

The Bay Area is a major employment center, with over 3.4 million jobs reported in 2005.[105] A large percentage of this employment is in San Francisco. As shown in Table III.C-5, there were approximately 553,090 jobs in the City in 2005, approximately 17 percent of the 3.2 million total regional jobs. Development of cumulative projects in the Bay Area would be expected to result in indirect population growth through provision of increased employment opportunities. Employment growth would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. It is possible that development of the cumulative projects could result in substantial employment growth that would result in a regional housing shortage. This is a potentially significant cumulative impact.

- Development at the Project site would provide 10,730 permanent jobs by 2032 (along with temporary construction-related jobs). Regional employment in 2005 consisted of 3.2 million jobs, with a projected increase of approximately 1.7 million jobs to 4.9 million jobs in 2030. San Francisco has traditionally experienced, and will continue to experience, ample employment opportunities that are not met by an equal supply of housing within the City, or even the Bay Area. The Project's contribution of 10,730 permanent jobs would represent 0.3 percent of the anticipated increase in regional employment through 2030 (the closest year to Project build-out for which employment projections have been prepared). The Project's employment would result in a related increase in housing demand for 8,263 units, as shown in Table III.C-9, which would be less than the total number of units provided by the Project.

Therefore, the population growth associated with increased employment from the Project would not result in housing demand that would exceed planned regional housing development, and would not be substantial. Because the employment increase associated with the Project would not be individually substantial or contribute to an exceedance of the City's employment projections, the Project would not result in a cumulatively considerable contribution to a potentially significant cumulative impact related to employment. The Project's cumulative impact would be less than significant.

Displacement of Existing Housing

Cumulative projects in the City and County of San Francisco could displace substantial numbers of people or existing housing and/or could necessitate construction of replacement housing elsewhere. Since there is a housing shortage in the City, as noted above, any projects that result in net displacement of existing housing would be considered to result in a potentially significant impact on housing.

The Project would demolish and replace 256 units at the Alice Griffith public housing site; the Project would not displace existing residents. Current vacant portions of the Alice Griffith site would be developed, and existing residents would occupy replacement public housing units before existing structures would be demolished. Overall, the Project would develop a total of 1,210 units of public housing, affordable housing, below-market rate housing, and market-rate housing in the Alice Griffith subarea. As the Project would not permanently displace any existing residents and would have no impact with respect to this threshold, it would not make a cumulatively considerable contribution to any potentially significant cumulative impact with regard to displacement of persons or housing. There would be no Project cumulative impact.

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[105] Association of Bay Area Governments, *Projections 2007,* 2006.

SECTION III.D TRANSPORTATION AND CIRCULATION

III.D.1 Introduction

This section analyzes the potential Project-level and cumulative impacts on transportation and circulation resulting from implementation of the Project. Transportation-related issues of concern that are addressed include traffic on local and regional roadways, transit, bicycles, pedestrians, parking, freight loading, and construction-related activities. Transportation impacts are assessed for the land use development program for weekday AM and PM commute periods, and also for Sunday non-game day conditions. Impacts of the proposed stadium are assessed for 49ers game day conditions on a Sunday, and also for a secondary event conditions that would affect the weekday PM peak period. Impacts of events at the proposed arena were also examined separately for weekday PM peak period conditions. This section also identifies feasible mitigation measures that would reduce or avoid significant impacts.

This section is based on information contained in the Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study, prepared by CHS Consulting, Fehr & Peers, and LCW Consulting. A copy of the Final Transportation Study is included as Appendix D (Transportation Study).

III.D.2 Setting

The transportation study area includes all aspects of the transportation network that may be measurably affected by the Project. The transportation study area is defined by travel corridors and by facilities such as bus stops/transit stations. It includes the freeway segments, freeway ramps, and existing and proposed street intersections that residents and visitors would use in traveling to and from the Project. Figure III.D-1 (Transportation Study Area) presents the transportation study area.

A total of 59 existing intersections (including five intersections within the City of Brisbane), 11 freeway on- and off-ramps, and five freeway segments within the study area were identified as key locations that would likely be impacted by the Project, and were selected for detailed study of the Project impacts. The study intersections include all major intersections along Third Street, Bayshore Boulevard, and access routes to and from US-101 (including the off-ramp and local street junctions). Intersections further away were not analyzed as part of the study, as Project traffic remaining on local streets would be dispersed such that the Project traffic would not meet the significance thresholds identified in this section. Figure III.D-2 (Traffic Analysis Locations) presents the traffic analysis locations.

The transit analysis included an assessment of the Muni transit lines within the transportation study area that would serve the Project site, and/or be affected by vehicular traffic generated by the Project.

The parking analysis focused on three subareas where the stadium game day parking would occur including the on-site and off-site lots, as well as residential streets adjacent in Little Hollywood, India Basin and Bayview/Candlestick Point.

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-1 Candlestick Point — Hunters Point Shipyard Phase II EIR

TRANSPORTATION STUDY AREA

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-2 Candlestick Point — Hunters Point Shipyard Phase II EIR

TRAFFIC ANALYSIS LOCATIONS

Roadway Network

Regional Access

Travel to and from the Project vicinity involves the use of regional transportation facilities, highways, and transit services that link San Francisco with other parts of the Bay Area and Northern California. Candlestick Point is accessible by local streets with connections to and from regional freeways and highways in the state system.

The Project site is served by US-101, with freeway interchanges at Harney Way and Alana Way, Bayshore Boulevard/Third Street and Cesar Chavez Street. These interchanges provide full directional access, except at Bayshore/Third there is no northbound on-ramp, and at Cesar Chavez Street there is no southbound on-ramp. US-101 has a southbound off-ramp at Paul/San Bruno; southbound and northbound on-ramps at Industrial Avenue; and southbound on- and off-ramps and a northbound off-ramp at Silver Avenue.

US-101 and I-280 merge approximately two miles north of Candlestick Point. North of the US-101/I-280 junction, US-101 merges with I-80 which leads to the Bay Bridge and the East Bay. Approximately two miles south of Candlestick Point, US-101 merges with I-380[106] near the San Francisco International Airport.

Local Access

The primary streets that serve the Project vicinity, listed in alphabetical order, include.

Alana Way is an approximately 1,500-foot two-way roadway segment that connects Beatty Avenue with Harney Way. It serves as the primary connection between Harney Way and US-101 southbound ramps at Alana/Beatty. Alana Way has one travel lane in the eastbound direction towards Harney Way, and two travel lanes in the westbound direction towards Beatty Avenue. On-street parking is not permitted at any time.

Arelious Walker Drive (previously named Fitch Street) is a north/south discontinuous roadway that is divided by Yosemite Slough and Hunters Point hill. Arelious Walker Drive runs between Gilman and Carroll Avenues, between Shafter and Palou Avenues, and between Innes and Galvez Avenues. Like other north/south streets in the vicinity, the Arelious Walker Drive alignment has a 64-foot-wide right-of-way with room for two 10-foot-wide sidewalks (presently un-paved). This street serves as an alternative way to access the northern unpaved privately owned parking lots used for stadium parking. Arelious Walker Drive between Gilman and Carroll Avenues is part of Bicycle Route #805, and is part of the unimproved on-street Bay Trail.

- **Bayshore Boulevard** is a north/south arterial that generally parallels US-101. Bayshore Boulevard has two to three travel lanes in each direction, separated by a median. The General Plan designates Bayshore Boulevard as a Major Arterial, part of the MTS Network, and a Transit Preferential Street (other—secondary), and a Neighborhood Commercial Street. South of Arleta Avenue, Bayshore Boulevard is designated as a Transit Preferential Street (other—secondary). Bayshore Boulevard is part of Bicycle Routes #25 and #5. The T-Third light rail line runs on Bayshore Boulevard between Hester Avenue and Sunnydale Avenue.

[106] I-380 is a short 3.3-mile east/west highway that connects I-280 in San-Bruno with US-101 near the San Francisco International Airport.

Beatty Avenue is a two-way east/west roadway between Tunnel Avenue and the US-101 southbound ramps at the intersection of Alana/Beatty. Beatty Avenue has one travel lane in each direction.

Blanken Avenue is a two-way east/west roadway that extends from Bayshore Boulevard through the Little Hollywood area west of Executive Park. The roadway has one lane in each direction with sidewalks and unrestricted parking on both sides of the street. Commercial vehicles weighing more than 6,000 pounds are prohibited from using this roadway as a through route. Blanken Avenue terminates at the intersection of Executive Park Boulevard and Candlestick Road.

Cargo Way is an east/west roadway that extends between Third and Jennings Streets, and serves as the primary access point for the Port of San Francisco Intermodal Container Terminals. Cargo Way generally contains two travel lanes in each direction. The General Plan identifies Cargo Way as a Secondary Arterial, and as a street with significant truck traffic. Cargo Way is part of the unimproved on-street Bay Trail.

Carroll Avenue is an east/west roadway between Third Street and Arelious Walker Drive. Carroll Avenue has one eastbound lane and two westbound lanes, with a right-of-way width of 80 feet. It has discontinuous sidewalks, and, due to the rail tracks, there is no sidewalk on the south side of Carroll Avenue between Jennings and Third Streets. Between Ingalls and Hawes Streets there are no sidewalks on the north side of the street, and between Hawes and Griffith Streets there are no sidewalks on either side of the street. Sidewalks to the east of Ingalls Street are generally discontinuous or frequently obstructed by parked vehicles. On-street parking is permitted west of Ingalls Street. The General Plan identifies Carroll Avenue as a street with significant truck traffic. Carroll Avenue is a part of Bicycle Route #805. Between Arelious Walker Drive and Ingalls Street, Carroll Avenue is currently part of the unimproved on-street Bay Trail.

Cesar Chavez Street is a major east/west arterial between Douglass Street to the west and the Port of San Francisco North Container Terminal, east of Third Street. In the vicinity of the Project, Cesar Chavez Street generally has two to three travel lanes in each direction, with a center median. West of Guerrero Street, Cesar Chavez Street has one lane in each direction. In the General Plan, Cesar Chavez Street is identified as a Major Arterial in the CMP Network from Guerrero Street to Third Street, a Secondary Arterial east of Third Street, and part of the MTS Network. It is identified as a Route with Significant Truck Traffic east of US-101. Cesar Chavez Street is part of the Bicycle Route #60.

Crisp Avenue[107] is an east/west roadway that extends from the intersection of Griffith/Palou to Spear Avenue within the Shipyard. Public vehicle access is currently not permitted, with the exception of emergency vehicles, and the roadway is currently gated (Crisp south gate) at the intersection of Griffith/Palou. Crisp Avenue served as the primary truck and rail access into the Shipyard until 1971. Crisp Avenue would be reopened as part of the Project.

Evans Avenue is an east/west arterial, with two travel lanes in each direction. Evans Avenue extends between Cesar Chavez Street and Jennings Street (where it becomes Hunters Point Boulevard). The General Plan identifies Evans Avenue between Cesar Chavez Street and Third Street as a Major Arterial in the CMP Network, and part of the MTS Network. Evans Avenue between Third Street and Jennings Street

[107] Background documents relevant to this Project variously use the term Crisp Road or Crisp Avenue; irrespective of the use of Road or Avenue, the text and/or graphics are referring to that section of road that travels from Revere Avenue to Spear Avenue.

is identified as a Secondary Arterial, and part of the MTS Network. The General Plan also identifies Evans Avenue as a street with significant truck traffic. Evans Avenue is part of Bicycle Route #68, and between Third and Jennings Streets a bicycle lane is provided in each direction.

Geneva Avenue is a major east/west roadway that connects Bayshore Boulevard in Brisbane and Daly City to State Route 1 and I-280 in San Francisco. Geneva Avenue generally has two travel lanes in each direction. The General Plan designates Geneva Avenue as a major arterial, and as a Transit Preferential Street. It is also part of the Congestion Management Program Network. Geneva Avenue is part of Bicycle Route #90. The Geneva Avenue Corridor is part of an ongoing Transit Preferential Street study by SFMTA to identify short- and mid-term improvements to increase transit reliability, performance, and service.

Gilman Avenue is an east/west street between Third Street and Giants Drive/Hunters Point Expressway. Gilman Avenue has one eastbound travel lane and two westbound lanes, and on-street parking is generally permitted. As with Jamestown and Ingerson Avenues, commercial vehicles weighing more than 6,000 pounds are prohibited from Gilman Avenue between Third and Fitch Streets, except for local service.

Griffith Street is a north/south discontinuous roadway that is divided by Yosemite Slough. On the south side of the slough, Griffith Street runs between Gilman Avenue and Cameron Way. North of the Slough, Griffith Street extends from Navy Road south to Thomas Avenue. Between Thomas Avenue and the slough, Griffith Street is an unimproved dirt road. The General Plan identifies Griffith Street between Thomas Avenue and Crisp Avenue as a street with significant truck traffic.

Harney Way is the primary southern access road to Candlestick Point. Harney Way provides a direct connection between US-101 and Jamestown Avenue. Vehicles destined to and from US-101 northbound use the Harney Way ramps, while vehicles destined to and from US-101 southbound use the Alana/Beatty ramp on the west side of US-101 (via Alana Way). Between Alana Way and Jamestown Avenue, Harney Way has two travel lanes in each direction. On-street parking is not permitted at any time, and a sidewalk is provided only on the north side. Harney Way is part of Bicycle Route #805.

Hunters Point Boulevard is an arterial that connects Evans Avenue at Jennings Street with Innes Avenue. Hunters Point Boulevard and Innes Avenue serve as the primary access road to the Shipyard. Hunters Point Boulevard has two travel lanes in each direction. The General Plan identifies Hunters Point Boulevard as a Secondary Arterial, and part of the MTS Network. It also identifies Hunters Point Boulevard as a street with significant truck traffic. Hunters Point Boulevard is part of Bicycle Route #68, and contains a bicycle lane in each direction.

Hunters Point Expressway (and the road south of the Harney Way/Jamestown Avenue intersection, called Jamestown Avenue Extension) circles the existing stadium and parking lot, and connects the east end of Jamestown Avenue with the east end of Gilman Avenue. Hunters Point Expressway provides access to the Candlestick Point State Recreation Area. The number of travel lanes on Hunters Point Expressway varies. In general, there are two continuous travel lanes in each direction, with additional lanes providing access between Jamestown and Gilman Avenues and the gates to the on-site parking. On-street parking is not permitted at any time. However, along parts of Jamestown Avenue Extension, on-street parking is permitted but restricted on event days. Hunters Point Expressway is part of Bicycle Route #805.

Illinois Street is a two-way, north/south roadway that generally parallels Third Street, extending from 16th Street over the Islais Creek Channel and merges into Cargo Way at the Amador Street intersection. The roadway primarily has one lane in each direction with sidewalks and on-street parking on both sides of the street

Indiana Street is a north/south roadway between Mariposa and Tulare Streets. Between Cesar Chavez and 25th Streets, Indiana Street operates one-way northbound and provides access to the I-280 northbound on-ramps at 25th Street. Indiana Street generally has on-street parking, both perpendicular and parallel, on both sides of the street. Indiana Street is part of Bicycle Route #907.

Ingalls Street is a north/south roadway between Jamestown Avenue and Innes/Middle Point. Ingalls Street has one travel lane in each direction, and on-street parking and sidewalks on both sides of the street. Ingalls Street has narrow sidewalks and very wide travel lanes between Yosemite Avenue and Thomas Avenue. Prior to the closure of the Hunters Point Shipyard, Ingalls Street was part of the designated truck route between Carroll Avenue and the currently inactive south (Crisp) gate at Palou Avenue. The General Plan identifies Ingalls Street between Carroll and Thomas Avenues as a street with significant truck traffic. Ingalls Street between Carroll and Yosemite Avenues is currently part of the unimproved on-street Bay Trail.

Ingerson Avenue is an east/west street between Third Street and Giants Drive. Ingerson Avenue has one travel lane in each direction and on-street parking is permitted. Commercial vehicles weighing more than 6,000 pounds are prohibited from traveling on Ingerson Avenue between Third and Arelious Walker Drive, except for local service.

Innes Avenue is an east/west arterial that provides direct access to Hunter Point Shipyard's Innes (north) gate. It contains two travel lanes in each direction. The General Plan identifies Innes Avenue as a Secondary Arterial and part of the MTS Network. It also identifies Innes Avenue as a street with significant truck traffic. Innes Avenue is part of Bicycle Route #68.

Jamestown Avenue is an east/west street between Third Street and Hunters Point Expressway. West of Redondo Street, Jamestown Avenue has one travel lane in each direction. East of Redondo Street to Giants Drive, there is a substantial change in lane width as Jamestown Avenue increases to one lane in the eastbound direction and two lanes in the westbound direction. Commercial vehicles weighing more than 6,000 pounds are prohibited from using Jamestown as a through route. On-street parking is generally permitted on Jamestown Avenue. Jamestown Avenue provides access to Bayview Park and the Candlestick Point Recreation area, and is identified in the General Plan as a Recreational Street.

Oakdale Avenue is an east/west arterial between Bayshore Boulevard and Third Street. East of Third Street, Oakdale Avenue is discontinuous and is generally a residential street. The General Plan identifies Oakdale Avenue between Bayshore Boulevard and Third Street as a Secondary Arterial. Oakdale Avenue between Bayshore Boulevard and Phelps Street is part of Bicycle Route #170, and bicycle lanes are provided on both sides of the street between Selby and Phelps Streets.

Palou Avenue is an east/west roadway between Barneveld Avenue and Griffith Street. It generally has one travel lane in each direction, and parking on both sides of the street. Palou Avenue has truck restrictions (vehicles in excess of 6,000 pounds prohibited) between Selby Street and Griffith Street. Between Phelps and Griffith Streets, Palou Avenue is part of Bicycle Routes #7 and #70.

Pennsylvania Avenue is a two-way north/south roadway between 17th and Cesar Chavez Streets. Pennsylvania Avenue generally has on-street parking on both sides of the street. Pennsylvania Avenue provides on- and off-ramp access to southbound I-280 at Mariposa, 18th, 25th and Cesar Chavez Streets.

Sunnydale Avenue is a two-way east/west roadway that extends west of Bayshore Boulevard to Persia/Mansell. To the east of Bayshore Boulevard, Sunnydale Avenue is an unpaved dead-end roadway. West of Bayshore Boulevard, the roadway has one lane in each direction with sidewalks and on-street parking on both sides.

Third Street is the principal north/south arterial in the southeast part of San Francisco, extending from its interchange with US-101 and Bayshore Boulevard to Market Street in downtown. It is the main commercial street in the Bayview Hunters Point neighborhood and also serves as a through street and an access way to the industrial areas north and east of US-101. In the Project vicinity, Third Street has two travel lanes in each direction. On-street parking is generally permitted on one side of the street. The T-Third light rail operates in an exclusive median right-of-way, with the exception of the segment between Kirkwood and Thomas Avenues, where the light rail shares the travel lane with vehicles. In the General Plan, Third Street is designated as a Major arterial, as a Transit Preferential Street (TPS) in the General Plan, and as a route with significant truck traffic (between the segment between Jerrold Avenue and Fourth Street).

Thomas Avenue is an east/west roadway between Third and Griffith Streets. West of Ingalls Street, Thomas Avenue is a residential street, while east of Ingalls Street, there is a mix of land uses, including residential and light industrial uses. The General Plan identifies Thomas Avenue between Ingalls and Griffith Streets as a street with significant truck traffic.

Tunnel Avenue is a two-way north/south roadway that extends south of Bayshore Boulevard and merges into Bayshore Boulevard at Old County Road. The roadway has one lane in each direction with sidewalks and unrestricted on-street parking on both sides of the street north of Sierra Point Lumber. On-street parking is prohibited on Tunnel Avenue south of Sierra Point Lumber. Tunnel Avenue provides access to Bayshore Caltrain Station and to the US-101 ramps at Alana/Betty. Tunnel Avenue is part of Bicycle Route #905.

Underwood Avenue is an east/west roadway between Third Street and Hawes Street. Underwood Avenue is primarily a residential street between Third and Jennings Streets, and between Jennings and Ingalls Streets there is a mix of residential and light industrial land uses. Between Ingalls Street and Hawes Streets, Underwood Avenue is an unimproved street without paving or gutters, with light/medium industrial land uses.

25th Street is a two-way east/west roadway two blocks north of Cesar Chavez Street between Michigan Street to the east and Grand View Avenue, near Market Street, to the west. It is discontinuous across US-101. 25th Street has one travel lane in each direction, with parking on both sides of the street.

Intersection Operations

Existing conditions on regional facilities and at local intersections were analyzed for the weekday AM (8:00 to 9:00 A.M.) and PM (5:00 to 6:00 P.M.) peak hours, and for Sunday (no football game) PM peak hour (4:00 to 5:00 P.M.) conditions. The weekday AM and PM peak hours consider the current morning and evening commute periods. The Sunday PM peak hour coincides with the time that afternoon football games typically end, and the majority of the spectators depart the stadium. Figure III.D-2 presents the study intersections.

Traffic conditions at the study intersections were evaluated using level of service (LOS). Level of Service is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. Table III.D-1 (LOS Definitions for Signalized and Unsignalized Intersections) defines each of the levels of service and shows the correlation between average control delay and level of service.

Table III.D-1 LOS Definitions for Signalized and Unsignalized Intersections

Control/ LOS	*Description of Operations*	*Average Control Delay (seconds per vehicle)*
Signalized		
A	Insignificant Delays: No approach phase is fully used and no vehicle waits longer than one red indication.	≤ 10
B	Minimal Delays: An occasional approach phase is fully used. Drivers begin to feel restricted	> 10.0 and ≤ 20.0
C	Acceptable Delays: Major approach phase may become fully used. Most drivers feel somewhat restricted	> 20.0 and ≤ 35.0
D	Tolerable Delays: Drivers may wait through no more than one red indication. Queues may develop but dissipate rapidly without excessive delays	> 35.0 and ≤ 55.0
E	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long queues form upstream	> 55 and ≤ 80
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections	> 80.0
Unsignalized		
A	No delay for STOP-controlled approach	≤ 10.0
B	Operations with minor delays	> 10.0 and ≤ 15.0
C	Operations with moderate delays	> 15 and ≤ 25.0
D	Operations with some delays	> 25.0 and ≤ 35.0
E	Operations with high delays and long queues	> 35.0 and ≤ 50.0
F	Operations with extreme congestion, with very high delays and long queues unacceptable to most drivers	> 50.0

SOURCE: Highway Capacity Manual (HCM 2000), Transportation Research Board, 2000.

During the weekday AM and PM, and Sunday PM peak hours, most study intersections currently operate at LOS D or better. During the weekday AM peak hour, the intersections of Cesar Chavez/Pennsylvania/I-280 and San Bruno/Silver operate at LOS E conditions. During the weekday PM peak hour, the intersection of Bayshore/Alemany/Industrial operates at LOS E conditions. The poor operating conditions at intersections operating at LOS E are generally related to high volumes of traffic destined to US-101 and I-280. During Sunday PM peak hour conditions (without a football game), none of the 59 study intersections currently operate at LOS E or LOS F conditions. Existing operating conditions for local intersections are provided in Table III.D-9 through Table III.D-11 in Section III.D.4 (Impacts).

Freeway Mainline Operations

The LOS for a freeway section, weaving section, and on-ramp junction with the freeway is based on vehicle density (passenger cars/lane/mile) and service volume (passenger cars/hour) using the relationships presented in Table III.D-2 (LOS Definitions for Freeway Mainline, Weaving, and Ramp Junction). Service volume is the primary measure of the overall weaving segment. The specific level of service, and thus

service volume, is prescribed by the weaving movement predicated on the weaving volume, number of lanes, and length of weave relationship. The value of service volume is determined with the aid of nomographs published in *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, by J Leisch & Associates, September 1983.

Table III.D-2 LOS Definitions for Freeway Mainline, Weaving, and Ramp Junction

	Maximum Density (Passenger Cars per Mile per Lane)		*Service Volume (Passenger Cars per Hour)*		
			Freeway Weaving Sections (Lanes)		
LOS	*Basic Freeway Sections*	*Freeway Weaving Segments and Ramp Junctions*	*2*	*3*	*4*
A	< 11	< 10	< 750	< 800	< 850
B	> 11 to 18	> 11 to 20	>750 to 1,000	>800 to 1,100	>850 to 1,200
C	> 18 to 26	> 20 to 28	>1,000 to 1250	>1,100 to 1,350	>1200 to 1,450
D	> 26 to 35	> 28 to 35	>1,250 to 1550	>1,350 to 1,600	>1,450 to 1,650
E	> 35 to 45	> 35	>1,550 to 1,900	>1,600 to 1,900	>1,650 to 1,900
F	> 45	Demand exceeds capacity		> 1900	

SOURCE: Highway Capacity Manual (HCM), Chapter 23: Basic Freeway Sections and Chapter 25: Ramps and Ramp Junctions Methodology, Transportation Research Board, 2000, Completion of Procedures for Analysis and Design of Traffic Weaving Sections, Jack E. Leisch & Associates, September 1983.

Freeway mainline analysis was conducted at the following segments:

- US-101 northbound—between Cesar Chavez Street and Vermont Street
- US-101 northbound—between Harney Way and Third Street/Bayshore Boulevard
- US-101 northbound—between Sierra Point Parkway and Harney Way
- US-101 southbound—between the I-80 merge and Cesar Chavez Street
- US-101 southbound—between Third/Bayshore and Alana Way
- US-101 southbound—between Alana Way and Sierra Point Parkway
- I-280 northbound—between the Alemany off-ramp and Alemany on-ramp
- I-280 southbound—between the Alemany on-ramp and Alemany off-ramp
- I-280 northbound—between 25th Street and Mariposa Street
- I-280 southbound—between Mariposa Street and 25th Street

All analysis segments experience LOS E or LOS F conditions during the commute periods—either in the AM or PM peak hours, with the exception of the segment of US-101 southbound between the I-80 westbound merge and Cesar Chavez. The segment of US-101 southbound between Third/Bayshore and Sierra Point experiences LOS E conditions during both the AM and PM peak hours. Existing operating conditions at the freeway mainline segments are provided in Table III.D-12 in Section III.D.4.

Ramp Operations

A ramp junction analysis was conducted to determine the operating conditions for ramp volumes merging with the freeway mainline traffic flow. Freeway ramps were evaluated using the *Highway Capacity Manual 2000* methodology for ramp merge and diverge conditions. Service levels at the on- and off-ramps are determined based on density, as calculated using the freeway volumes and the ramp volumes at each study location. Similar to the freeway mainline, the operating characteristics of the ramps are described using the concept of LOS (see Table III.D-2).

Freeway ramp junction analysis was conducted at the on-ramp and off-ramps:

- US-101 northbound on-ramp from Sierra Point Parkway
- US-101 northbound on-ramp from Harney Way
- US-101 northbound on-ramp from Bayshore Boulevard
- US-101 northbound on-ramp from Alemany Street
- US-101 northbound on-ramp from Bayshore/Cesar Chavez
- US-101 southbound off-ramp to Bayshore/Cesar Chavez
- US-101 southbound on-ramp from Cesar Chavez/Potrero
- US-101 southbound on-ramp from Alemany/San Bruno
- US-101 southbound on-ramp from Third/Bayshore
- US-101 southbound on-ramp from Alana Way
- US-101 southbound on-ramp from Sierra Point/Lagoon
- I-280 northbound off-ramp to Cesar Chavez
- I-280 northbound on-ramp from Indiana/25th
- I-280 southbound off-ramp to Pennsylvania/25th
- I-280 southbound on-ramp from Pennsylvania/25th

During the weekday AM and PM peak hours, all of the ramps currently operate at LOS D or better, with the exception of the US-101 southbound on- and off-ramps at Cesar Chavez, and northbound on-ramps from Cesar Chavez Street and Alemany Street. Existing operating conditions at the freeway mainline segments are provided in Table III.D-13 in Section III.D.4.

Freeway Ramp Diverge Queue Storage

Within dense urban areas such as San Francisco, off-ramp operating conditions are largely controlled by the operations at the off-ramp terminus with the street network. For key off-ramps in the study area, the off-ramp queues during the red signal phase were compared to the storage capacity of the off-ramp. The storage capacity of the off-ramp was calculated by estimating the distance between the freeway diverge gore point[108], and the stop bar for the off-ramp approach to the street intersection. Vehicle queue lengths on the off-ramp approaches to signalized intersections were estimated from intersection LOS calculations, by multiplying the 95th percentile vehicle queue of the constrained movement by 25 feet to account for average vehicle lengths and the space between queued vehicles.

The ramp queue storage analysis was conducted at the following off-ramps:

- US-101 northbound off to Harney Way
- US-101 northbound off to Bayshore/Cesar Chavez
- US-101 southbound off to San Bruno/Silliman
- US-101 southbound off to San Bruno/Mansell
- US-101 southbound off to Bayshore/Hester
- US-101 southbound off to Alana Way
- US-101 southbound off to Sierra Point/Lagoon
- I-280 northbound off to Cesar Chavez
- I-280 southbound off to Pennsylvania

[108] A gore point is the triangular area of land where freeways split or merge.

Under existing conditions, the queues at the off-ramp approach to the signalized intersections are accommodated within the ramp storage capacity. Existing ramp storage conditions at the off-ramps are provided in Table III.D-14 in the Impact analysis.

Transit

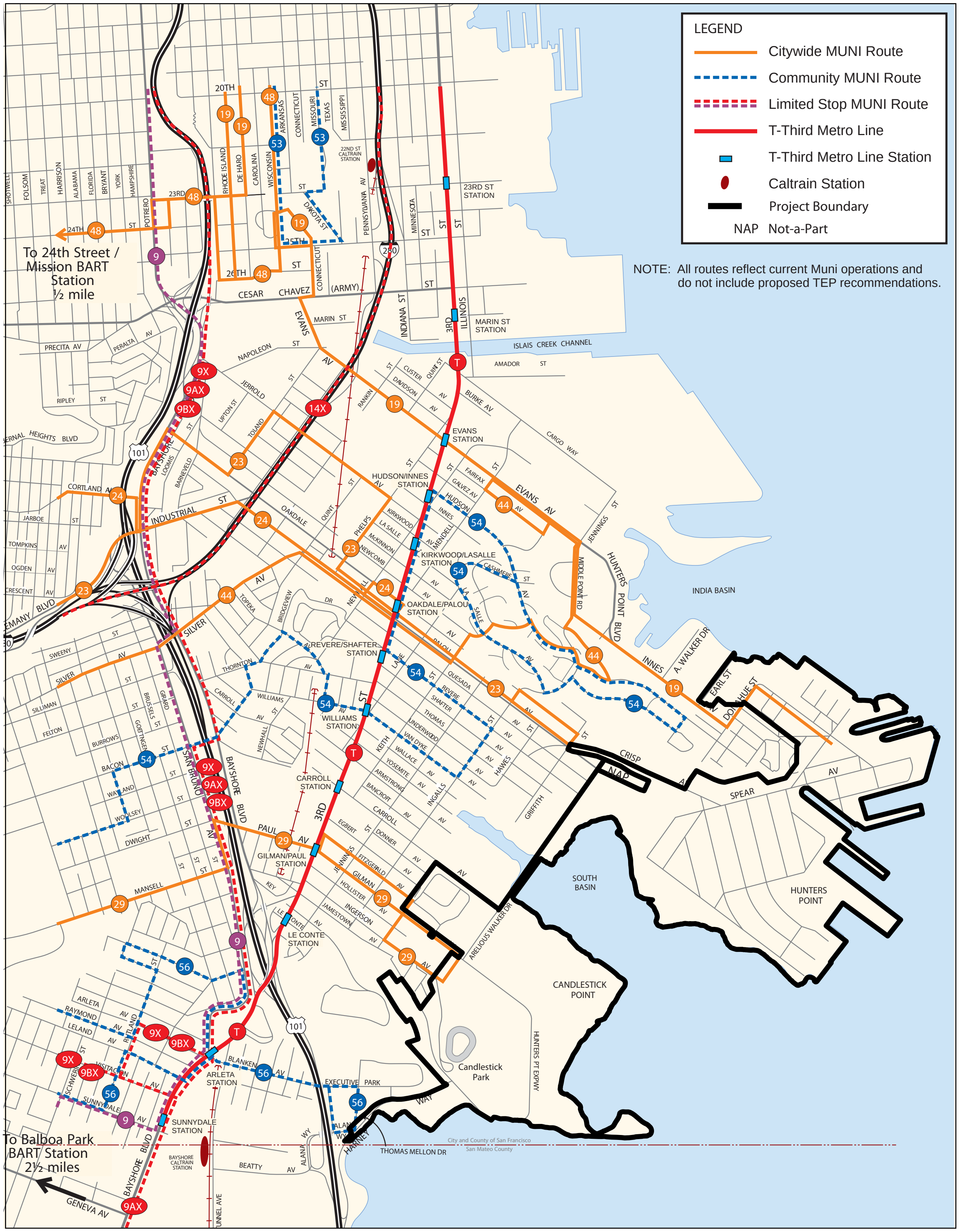
The study area is relatively well served by public transit, with routes providing crosstown, community, downtown, and regional service. Local service within the study area is provided by the San Francisco Municipal Railway (Muni) bus and light rail lines, which can be used to access regional transit operators. Service to and from the East Bay is provided by BART, AC Transit, and ferries; service to and from the North Bay is provided by Golden Gate Transit buses and ferries; and service to and from the Peninsula and South Bay is provided by Caltrain, SamTrans, and BART.

Figure III.D-3 (Existing Transit Network) presents the Muni lines serving the study area. Table III.D-3 (Muni Lines Serving Project Study Area) summarizes the frequency of service for the Muni bus and light rail lines serving the study area. Peak period service on most lines is at 8- to 10-minute headways between buses. The 54-Felton has headways between buses of 20 minutes, and the 56-Rutland has headways of 30 minutes. The 44-O-Shaughnessey runs most frequently, with 6-minute headways between buses.

Table III.D-3 Muni Lines Serving Project Study Area

	Frequency of Service (average time in minutes)		
Route	*AM Peak Period (7:00 to 9:00 A.M.)*	*Midday Period (9:00 A.M. to 4:00 P.M.)*	*PM Peak Period (4:00 to 6:00 P.M.)*
9-San Bruno	7.5	10	7.5
9X-Bayshore Express	10	12	10
9AX-Bayshore "A" Express	10	--	10
9BX-Bayshore "B" Express	15	--	10
19-Polk	10	24	10
23-Monterey	15	20	14
24-Divisadero	8.5	10	10
28L-19th Avenue	10	—	10
29-Sunset	10	15	10
44-O-Shaughnessey	6	15	7.5
48-Quintara-24th Street	12	20	12
54-Felton	20	20	20
56-Rutland	30	30	30
T-Third	8.5	10	8.5

SOURCE: SFMTA



SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-3

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING TRANSIT NETWORK

BART operates regional rail transit service connecting San Francisco with the East Bay and northern San Mateo County. BART provides service along Market and Mission Streets and near the western I-280 corridor in San Francisco. Transit connections can be made to the following BART stations from the Project site: Balboa Park Station via the 29-Sunset from Candlestick Point, Glen Park Station via the 23-Monterey and the 44-O'Shaughnessy, and the Embarcadero station via the T-Third light rail route. BART operates at service frequencies of three minutes in the peak periods for intra-San Francisco travel.

Caltrain provides rail passenger service on the Peninsula and the Santa Clara Valley between Gilroy and San Francisco. The Peninsula Corridor Joint Powers Board (JPB), a joint powers agency consisting of San Francisco, San Mateo, and Santa Clara Counties, operates the service. Caltrain currently operates 86 trains each weekday, with a combination of Baby Bullet, express, and local services. Headways during the peak periods are approximately ten to thirty minutes. The San Francisco Caltrain terminal is at Fourth Street between King and Townsend Streets to the north of the study area.

The closest active Caltrain station to the study area is the Bayshore station in Brisbane at the San Mateo/San Francisco border. The station is on Tunnel Avenue, just southeast of Bayshore Boulevard. Not all trains stop at the Bayshore Station. During the peak commute periods, one train per hour in each direction stops at the Bayshore Station. There are no direct connections with other transit services. However, Muni and SamTrans can be accessed by walking two to three blocks to bus stops along Bayshore Boulevard.

SamTrans, operated by the San Mateo County Transit District, provides bus service between San Mateo County and San Francisco. SamTrans operates 12 bus lines that serve San Francisco, including nine routes into the downtown area. However, only two routes—the 292 and 397—serve the Bayview neighborhood along Bayshore Boulevard; and only route 292 operates during peak hours. Headways during the peak commute periods are approximately 15 minutes per line. There are no direct SamTrans services to Candlestick Point, except during football game days.[109] Route 7B operates along Bayshore Boulevard and stops near the Bayshore Caltrain station on game days.

AC Transit is the primary bus operator for the East Bay, including Alameda and western Contra Costa Counties. AC Transit operates 37 routes between the East Bay and San Francisco, all of which terminate at the Transbay Transit Terminal, located on Mission Street, between First and Fremont Streets. Most Transbay service is peak-hour and peak-direction (to San Francisco during the AM peak period and from San Francisco during the p.m. peak period), with headways of 15 to 30 minutes per route. To access Candlestick Point, AC Transit riders must transfer at the Transbay Terminal to the T-Third line, and then to the 29-Sunset at Paul Avenue.

The Golden Gate Bridge, Highway, and Transportation District (GGBHTD) provides bus service between the North Bay (Marin and Sonoma Counties) and San Francisco. Golden Gate Transit operates 18 commuter bus routes and two basic routes with service between cities in the North Bay and San Francisco. Most routes serve either the Civic Center (via Van Ness Avenue and Mission Streets) or the Financial District (via Battery and Sansome Streets). Basic bus routes operate at 15 to 90 minute headways, depending on the time and day of the week. Commute and ferry feeder bus routes operate at more frequent intervals in the mornings and

[109] In 2008 SamTrans service to the stadium was taken over by Silverado Stages. In 2009, Golden Gate Transit service was taken over by California Wine Tours and Santa Clara VTA service was taken over by Silverado Stages.

evenings. Golden Gate Transit does not provide local service within San Francisco Golden Gate Transit can be accessed from the study area via the T-Third line, with a transfer near the Transbay Terminal.

The GGBHTD also provides ferry service between the North Bay and San Francisco. During the AM and PM peak periods, ferries operate between Larkspur and San Francisco and between Sausalito and San Francisco. The San Francisco terminal is at the Ferry Building, on The Embarcadero at Market Street. Access to the Ferry Building would generally require travel on the T-Third LRT line to the Embarcadero Station.

Bicycles

Existing bicycle facilities in the study area include routes that are part of the San Francisco Bicycle Network, and regional routes, part of the San Francisco Bay Trail system. Bikeways are typically classified as Class I, Class II, or Class III facilities.[110] Class I bikeways are bike paths with exclusive right-of-way for use by bicyclists or pedestrians. Class II bikeways are bike lanes striped with the paved areas of roadways and established for the preferential use of bicycles; Class III bikeways are signed bike routes that allow bicycles to share travel lanes with vehicles. Figure III.D-4 (Existing San Francisco Bicycle Route Network) presents the bicycle routes within the study area, as identified in the Official San Francisco Bike Route System; Figure III.D-5 (Existing San Francisco Bay Trail Plan Route) presents the existing Bay Trail facilities.

In June 2009, the San Francisco Bicycle Plan was approved by the SFMTA Board. Near-term improvement projects on the existing bicycle network in the study area are noted below, and both near-term and long-term improvements are described in additional detail in the "Analytic Method" section in Section III.D.4.

Route #5: Route #5 is the easternmost north/south bicycle route, runs between Visitacion Valley and North Beach, primarily as a Class III facility along Third Street and Illinois Street, and as a Class II facility along Bayshore Boulevard (south of US-101), The Embarcadero, and much of San Bruno Avenue. Since southbound Third Street does not cross over US-101 to connect with Bayshore Boulevard, southbound Bicycle Route #5 is routed onto Paul Avenue (via Connector Route #705) and San Bruno Avenue (also Bicycle Route #25). This split in the route is required, since the US-101 undercrossing between southbound Third Street and southbound Bayshore Boulevard that would require bicyclists to weave across high-speed traffic. Bicycle Route #5 connects with a regional bicycle route in Brisbane. San Francisco Bicycle Plan Project 4-3: Illinois Street Bicycle Lanes will provide Class II bicycle lanes in both directions on Illinois Street between 16th Street and Cargo Way.

Route #7: Route #7 is a Class III bike route between Mariposa Street and Carroll Avenue, via Indiana Street, Third Street, Phelps Street, Palou Avenue, and Keith Street. Route #7's southern terminus is at Keith Street and Carroll Avenue at the Bayview Playground. It is a Class III facility; however, wider travel lanes that allow bicyclists to ride outside of the path of vehicle travel are provided on sections of Indiana and Phelps Streets, and on Keith Street.

[110] Bicycle facilities are defined by the State of California in the *California Streets and Highway Code* Section, 890.4.

SOURCE: Fehr & Peers, 2009.

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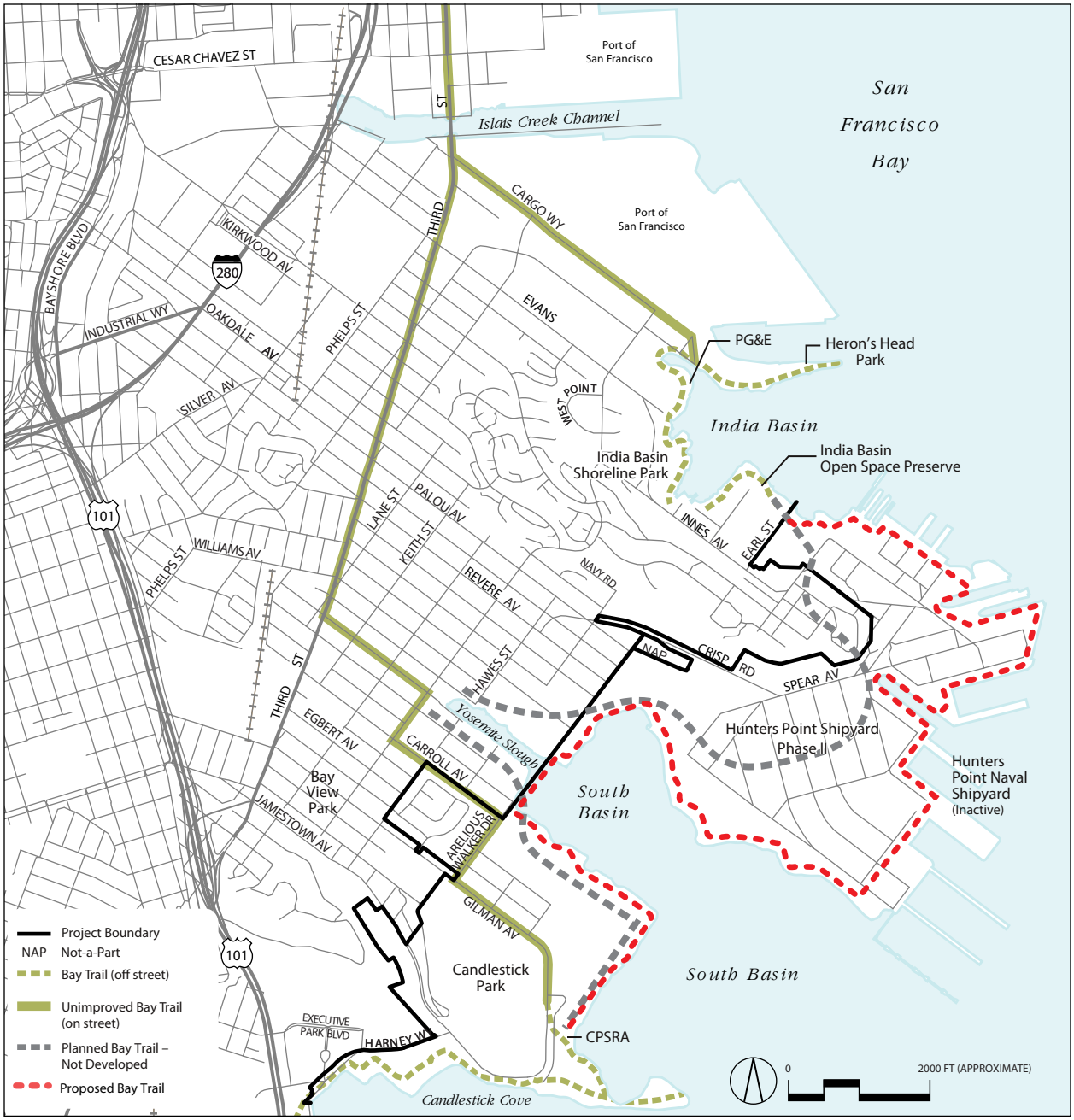
FIGURE III.D-4

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING SAN FRANCISCO BICYCLE ROUTE NETWORK



SOURCE: San Francisco Bay Trail Plan; PBS&J, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING SAN FRANCISCO BAY TRAIL PLAN ROUTE

FIGURE III.D-5

Route #25: Route #25 runs between the southeastern part of San Francisco and the Marina District. Route #25 runs along San Bruno Avenue, Bayshore Boulevard, and Oakdale Avenue in the Bayview Hunters Point area. Within the study area, Route #25 is a Class III facility. North of the study area, Route #25 runs as both a Class II facility (e.g., along Potrero Avenue, Harrison Street, and 11th Street), and as a Class III facility (e.g., 10th Street, Polk Street). San Francisco Bicycle Plan Project 5-4: Bayshore Boulevard Bicycle Lanes will involve the installation of Class II bicycle lanes in both directions of travel on Bayshore Boulevard between Cesar Chavez Street and Silver Avenue.

Route #60: Route #60 runs between the Great Highway/Vicente and Cesar Chavez Street/Illinois Street. In the study area, it is a Class III facility along Cesar Chavez Street between Bayshore Boulevard and Mississippi Street, and a Class II facility between Mississippi and Illinois Streets. San Francisco Bicycle Plan Project 5-5: Cesar Chavez Bicycle Lanes will involve the installation of Class II bicycle lanes in both directions on Cesar Chavez Street between Kansas Street (near US-101) and Mississippi Street (near I-280).

Route #68: Route #68 runs from the Innes gate at Hunters Point Shipyard north along Innes Avenue, Hunters Point Boulevard, and Evans Avenue to Cesar Chavez. This route has dedicated bike lanes (Class II) on both sides of Evans Avenue, and Hunters Point Boulevard between Innes Avenue and Third Street. San Francisco Bicycle Plan Project 4-4: Innes Avenue Bicycle Lanes will involve the installation of Class II or III bicycle facilities in both directions of Innes Avenue between Donahue Street and Hunters Point Boulevard.

East-West Route #70 runs along Palou Avenue, Silver Avenue, and Monterey Boulevard between the Bayview Hunters Point area and West Portal as a Class III facility. The eastern terminus of this route is currently the Crisp south gate to Hunters Point Shipyard at Griffith Street and Palou Avenue.

Route #170: Connector Route #170 runs along Oakdale Avenue between Third Street and Bayshore Boulevard. Between Third Street and Bayshore Boulevard, this route has Class II bicycle lanes on both sides of the street.

Route #805: Connector Route #805 is a Class III facility that connects between Beatty Avenue and Tunnel Avenue (near the Bayshore Caltrain Station) in Brisbane and Third Street and Carroll Avenue. This route passes Candlestick Park stadium and the Candlestick Point State Recreation Area via Harney Way, Hunters Point Expressway, Gilman Avenue, Arelious Walker Drive, and Carroll Avenue.

Route #905: Route #905 is a short Class III route that runs along Tunnel Avenue south, east of Bayshore Boulevard. Bicycle Route #905 connects with regional bicycle routes to the south in Brisbane and South San Francisco.

Route #907: Route #907 is a short Class II route that runs along Indiana Street between César Chávez Street and the embankment at Islais Creek, where it dead-ends.

Route #925: Route #925 is a short Class III route that runs along Blanken Avenue between Tunnel Avenue and Bayshore Boulevard, connecting Route #5 and Route #905.

The San Francisco Bay Trail is designed to create recreational pathway links to the various commercial, industrial, and residential neighborhoods that surround the San Francisco Bay. In addition, the trail connects points of historic, natural, and cultural interest; recreational areas such as beaches, marinas, fishing

- piers, boat launches, and over 130 parks and wildlife preserves totaling 57,000 acres of open space. At various locations, the Bay Trail consists of paved multi-use paths, dirt trails, and in some cases, bike lanes and sidewalks. Within the study area, the Bay Trail has two discontinuous segments of existing, off-street pathways, one in the area of Candlestick Point and Harney Way, and another segment which partially surrounds India Basin. The Bay Trail currently bridges the gap between Islais Creek and Candlestick Point with an inland route that shares portions of Gilman Avenue, Arelious Walker Drive, Carroll Avenue, Ingalls Street, Yosemite Avenue, and Third Street. An improved trail exists in the southern part of the Candlestick Point State Recreation Area where public access improvements have been made, but the northern section is unimproved within the Project site. The trail starts northeast of the US-101 northbound Harney Way ramps. Parking is available off of Harney Way, west of Jamestown Avenue (approximately 30 parking spaces are currently provided), and parking, restrooms, and boat ramp facilities are provided off of Hunters Point Expressway near Gilman Avenue. Portions of the Bay Trail are also improved to the northeast of the Shipyard within the India Basin Open Space and Shoreline Parks.

The majority of the study area is flat, with limited changes in grades, facilitating bicycling within and through the area. East of Third Street, there are active and inactive rail tracks within the roadways that could impede bicycle travel. While the Bayview Hill and the Hunters Point hill pose challenges for bicyclists, the majority of the study area is relatively flat.

Bicycle activity in the study area is generally low. Weekday AM and PM peak period and Saturday midday period bicycle volume counts were conducted on Third Street, Oakdale Avenue, and Evans Avenue. Hourly bicycle volumes ranged between 1 and 30 bicyclists per hour, with the greatest number on bicyclists on Third Street and on Oakdale Avenue. More bicyclists were observed on weekdays than weekends.

Pedestrians

Pedestrian facilities within the study area vary, between the areas on the east side of Third Street and the industrial land uses surrounding the Caltrain rail corridor on the west side of Third Street. On the west side of Third Street, many of the commercial facilities surrounding the railroad mainline have partial or no sidewalks. Several of the streets in this area have active and inactive railroad tracks and many of the former industrial and storage buildings in the area retain large raised freight loading/unloading platforms abutting the street.

On Third Street and on the residential streets immediately surrounding Third Street, the sidewalk network is adequate and relatively complete. In the light manufacturing areas surrounding Yosemite Slough the sidewalk network is less complete and frequently obstructed by illegally parked vehicles and or vehicles loading. The extent, condition, and usability of the sidewalks generally decrease closer to Yosemite Slough (within the Project vicinity). There are also gaps in the sidewalk network on Innes Avenue approaching Hunters Point Shipyard.

The Candlestick Point State Recreation Area has a network of existing multi-use trails that extend from the County line to a point just southeast of the intersection of Gilman Avenue and Donahue Street (an undeveloped 'paper' street).[111] Most of these paths are within the park and do not intersect the local roadways, although some connect to, or are part of, the Bay Trail.

[111] A paper street is a road or street that appears on maps but does not exist in reality.

There are several dedicated pedestrian overcrossings in the vicinity of Candlestick Park. These structures are designed to reduce pedestrian-vehicle conflicts associated with Candlestick Park events and adjacent schools. These include the stadium-related overcrossing of Jamestown Avenue just north of Harney Way and overcrossing of Harney Way, just west of Jamestown Avenue, and the overcrossing of Gilman Avenue at Griffith Street adjacent to the Bret Harte School.

Pedestrian activity in the immediate vicinity of the Project site is light throughout the day during non-game days. During game days, pedestrians flood the area traveling between the on-site and off-site parking facilities and the stadium.

Third Street is the primary pedestrian corridor in the study area, with the central commercial core located roughly between Thomas Avenue and Kirkwood Streets (south of Evans Avenue). Counts of pedestrian volumes at crosswalks at three intersections on Third Street were conducted in September 2007 during the weekday AM and PM peak periods. Peak hour pedestrian volume at the crosswalks ranged between 25 and 400 pedestrians per hour, with the greatest number of pedestrians at the intersection of Third/Palou.

Parking

In general, on-street parking in the study area is generally unrestricted (other than weekly street cleaning), and is typically permitted on both sides of the street. On the wider avenues in the study area (generally with an 80-foot-wide right-of-way width) with light industrial land uses, roadways, such as Donner Avenue and Bancroft Avenue between Jennings and Hawes Streets, accommodate 90-degree perpendicular parking. Along Third Street on-street parking is metered, and has been removed in the vicinity of the light rail stations. There are no Residential Permit Parking (RPP) areas within the study area.

Surveys of on-street parking were conducted for three subareas:

- Candlestick Point/Bayview—Within the mostly residential and partial industrial area bounded by Third Street to the west, Carroll Avenue to the north, Arelious Walker Drive to the east, and Jamestown Avenue to the south
- Little Hollywood—Within the mostly residential area bounded by Bayshore Boulevard to the west and north, US-101 to the north and east, and the San Francisco/San Mateo County line to the south
- India Basin—Within the mostly industrial area bounded by Jennings Street to the west, Hunters Point Boulevard/Innes Avenue to the south, Donahue Street to the east, and India Basin to the north

During the daytime, on-street parking utilization is greatest in the Candlestick Point/Bayview subarea, and ranges between 66 percent during the midday period (accommodating employee parking demand associated with the industrial uses) and 57 percent during the evening. Parking demand within the Little Hollywood residential neighborhood is greatest during the evening period, with parking occupancy at about 60 percent. Within the India Basin parking study area, weekday midday and evening parking utilization is low, between 17 and 28 percent, reflecting the limited residential and industrial uses in the area.

There are no City-owned off-street parking facilities in the study area. There is limited number of privately owned parking facilities in this subarea and most drivers rely on on-street parking in the area. The available privately owned off-street parking facilities serve the employees and visitors to the businesses adjacent to them and are not available for general public parking.

Existing Game Day Operations

The additional traffic added to the transportation network following a football game at Candlestick Park results in substantial congestion on local streets between parking facilities and the freeway, and on the freeways, particularly where game day traffic merges with other traffic already on the freeway. This section discusses the existing transportation conditions on days when football games are played at Candlestick Park.

Football Game Frequencies

Candlestick Park currently serves as the home of the San Francisco 49ers. The existing Candlestick Park stadium typically hosts up to 12 games per year, including eight regular season games, typically two pre-season games, and for teams that qualify for playoffs, typically two post-season games. Professional football games on the west coast are typically scheduled for 1:00 P.M. (Pacific Time) on Sundays, from September through early December. The post-season runs into January and games can be played on either Saturday or Sunday. At the conclusion of the college football season in late November, a few NFL games are played on Saturdays, as are some pre-season games. Successful teams typically play at least one Monday night (6:00 P.M.) game, and the 49ers have had at least one such home game in each of the past several seasons. Occasionally (no more than once per year), Sunday games are held at 5:00 P.M. The typical duration of a football game is approximately three hours.

Pre-Game and Post-Game Conditions

Ingress and Egress Routes

Vehicles access Candlestick Park by several routes, depending on the level of congestion and the vehicles' point of origin. Most vehicles arriving from the south (San Mateo and Santa Clara Counties, as well as traffic from Alameda County using the San Mateo or Dumbarton Bridges) use northbound US-101 and enter the site via the Harney Way exit. Vehicles from the north coming from either I-280 or US-101 use the Silver Avenue, Paul Avenue, Bayshore Boulevard/Third or the Alana/Beatty exits to reach the north access routes (Carroll, Gilman, and Jamestown) to the stadium. In order to accommodate peak inbound and outbound traffic volumes generated by the largest special events at Candlestick Park, traffic lanes on Harney Way and on the roadway surrounding the Candlestick Park parking lot (Jamestown Avenue Extension, Hunters Point Expressway and part of Gilman Avenue) are reversed on event days. Overhead Lane Use Control Signals are used to designate the direction of each lane.

On event days, each lane has either a green downward-pointing arrow or a red arrow above it to indicate to drivers in each direction whether they may drive in that lane. The portion of Harney Way between Alana Way near US-101 and Jamestown Avenue operates one-way eastbound (toward Candlestick Park) for several hours before events. Jamestown Avenue Extension and Hunters Point Expressway operate one-way counterclockwise before events. The portion of Gilman Avenue west of Candlestick Park Parking Lot Gate 4 is two-way before events to provide access to Gate F from the west. Once the pre-event traffic dies down, these roadways are converted back to two-way operation. In the last 30–60 minutes before the end of the event, the reversible roadways are converted to one-way operation away from the parking lot exits. Gilman Avenue operates one way westbound, while Hunters Point Expressway, Jamestown Avenue Extension and Harney Way operate one-way clockwise and westbound, respectively. During the post-game period, the Candlestick Park exit from northbound US-101 is closed to all traffic, in order to prevent off-ramp traffic

from conflicting with the one-way westbound post-event traffic on Harney Way. Additionally, all traffic using the Candlestick Park exit from southbound US-101 is forced to proceed westbound on Beatty Avenue in order to prevent this traffic from having to make a U-turn if it were to proceed eastbound on Alana Way. Once the post-event traffic dies down, the roadways revert to the normal two-way operation.

Traffic Operations

Pre-Game Conditions: For a typical Sunday football game starting at 1:00 PM, vehicle arrival is spread over about six hours with approximately 40 percent of the vehicles arriving between one and two hours prior to the game start time, and 60 percent within the other five hours prior to the game. Since the arrival is spread out over a period of time, the game-related traffic does not substantially affect traffic flow on the study area freeways. During a recent Sunday football game, some localized congestion was observed at US-101 northbound upstream of the Harney Way exit, as vehicles queued up from Harney Way and on US-101 southbound upstream of the Alana/Beatty exit. The vehicles accessing the stadium from Third Street contribute to congestion and queues on the local residential streets, including Third Street, Gilman Avenue, Carroll Avenue and Jamestown Avenue. In September 2009, a pedestrian bridge was installed on Hunters Point Expressway at the location of the pedestrian crossing to the State Park parking lots. Since installation of the pedestrian bridge, pre-game traffic conditions improved.

During pre-game conditions, San Francisco Police Department (SFPD) officers, Parking Control Officers (PCOs), and California Highway Patrol (CHP) officers are posted on roadways leading to the stadium, in particular Harney Way, Hunters Point Expressway, Ingerson Avenue, and Gilman Avenue. Officer tasks include ensuring smooth traffic flow on the one-way inbound Harney Way, directing vehicles to proceed to downstream gates and off-site parking lots, and towing vehicles that obstruct traffic movement. In addition, they are responsible for providing priority to transit vehicles, ensuring pedestrian safety, and orderly queuing at the gates to the internal parking lot. Approximately 60 officers are posted during a football game.

Post-Game Conditions: Immediately following the end of the game, most spectators attempt to leave the stadium parking facilities, although depending on the game outcome, some patrons leave early to avoid congestion and a portion remain for tailgate parties. Players, press, administrative staff, and employees generally remain on site longer than spectators. Typical clearance times for each of the egress routes following a sell-out football game vary; however, congestion and queues in the vicinity of the stadium generally clear up approximately one and a half to two hours following the end of the game.

During post-game conditions, Harney Way is converted to one-way outbound operation, with two lanes merging to one onto the northbound on-ramp and two lanes continuing onto Alana Way to access the southbound on-ramp and Beatty Avenue. To facilitate flow onto the on-ramps, the US-101 northbound off-ramp is closed at Harney Way, and the allowable movements at the southbound off-ramp are restricted to westbound through onto Beatty Avenue. During post-game conditions, the southbound on-ramp is metered via a ramp-metering signal to ensure stable traffic conditions on freeway mainline. Travel lanes on the mainline are also closed to increase the capacity of the on-ramp during post-game conditions. Field observations during recent games indicated that there is some localized congestion on US-101 southbound upstream of and at the ramp merge influence area. Caltrans uses Variable Message Signs (VMS) on southbound US-101 and southbound I-280 upstream of the on-ramp to direct through traffic to southbound I-280 instead of southbound US-101 during post-game conditions.

On US-101 northbound, stadium traffic generally does not have difficulty merging with the freeway mainline traffic, as northbound US-101 traffic volumes approaching Harney Way are generally lower than the southbound volumes. However, as stadium traffic merges with I-80 eastbound traffic leaving downtown San Francisco, congestion and queues extend upstream from the Bay Bridge to the US-101/I-280 merge. This congestion persists long after all congestion and queues dissipate in the vicinity of Candlestick Point.

The surge of vehicles exiting the parking facilities results in queues on the internal roadways and at access roads to Third Street and the on-ramps to US-101. The queues on Jamestown Avenue, Gilman Avenue, and Carroll Avenue are mainly constrained by the capacity of the intersections of the respective street at Third Street. The traffic signals on Third Street are timed to prioritize transit movements along Third Street, including the T-Third light rail, which results in limited capacity for cross-traffic.

During post-game conditions, the San Francisco Police Department officers, PCOs and CHP officers ensure that traffic exits the stadium parking facilities in an orderly fashion and that vehicles access the regional routes as quickly as possible. Responsibilities of the officers include waving vehicles through STOP signs and ensuring that Ingerson Avenue is used by buses, taxis, and emergency vehicles. A CHP officer is posted at the intersection of Alana/Beatty to wave vehicles through the STOP sign and onto the US-101 southbound on-ramp. However, many vehicles come to a full stop prior to processing through the intersection.

Transit Services

Muni and Tri-Delta Transit and numerous private charter bus operators provide game day special services to Candlestick Park. BART, AC Transit, and Caltrain do not provide any special game day services. The San Mateo County Transit District (SamTrans), Golden Gate Transit, and the Santa Clara Valley Transportation Authority (VTA) have historically provided transit service to Candlestick Park; however, they have recently stopped providing this service, which will instead be provided by private charter companies.

Muni: On game days, Muni offers express services 75X, 77X, 78X, and 79X to and from the stadium. Line 75X provides express, non-stop shuttle service between Candlestick Park and the Balboa Park BART Station (via Geneva Avenue and Bayshore Boulevard). Line 77X provides express service from the Van Ness corridor, with service between the intersection of California/Van Ness and Candlestick Park (via Van Ness Avenue, South Van Ness Avenue, Mission Street and US-101). Line 78X provides express service along the Park Presidio/19th corridor, from the Funston/California intersection (via Park Presidio, 19th Avenue, Junipero Serra Boulevard, Ocean Avenue, Geneva Avenue, and Bayshore Boulevard). Line 79X provides express service from downtown, with service between Candlestick Park and the Sutter/Montgomery intersection (via Stockton Street, Fourth Street, Folsom Street, and U.S 101). The service starts about three hours prior to the beginning of the football game, and operates at headways of approximately 7 to 10 minutes.

Muni also operates special shuttle services from the Bacon/San Bruno intersection (86-Stadium Shuttle) and from the Gilman/Paul T-Third station (87-Stadium Shuttle). The shuttle service begins about four hours before the game and operates at approximately 5 to 10 minute headways. Approximately 6,500 spectators currently use the special Muni bus services to the stadium.

Tri-Delta Transit: Tri-Delta Transit provides one special game day bus to Candlestick Park from eastern Contra Costa County, with stops in Brentwood, Antioch, and Pittsburg. Tickets may be purchased in advance, or on the bus on the day of the games.

Neither AC Transit nor BART provide special game day service. AC Transit riders can take AC Transit to the San Francisco Transbay Terminal, walk to the intersection of Sutter/Montgomery intersection and transfer to the Muni 9X-Bayshore Express to the stadium. BART riders from East Bay need to take BART to the Montgomery Station and transfer to the Muni 79X-Bayshore Express to the stadium. BART riders from San Mateo County need to take BART to the Balboa Park station and transfer to Muni Line 78X-Candlestick Express at Geneva Avenue.

Charter Buses: A substantial number of spectators using transit come by private charter buses. Various groups charter buses from private companies including Frontier Tour Charter Bus, Evans, Pro Trav Charter, and Sierra Pacific Tours. According to the San Francisco 49ers, approximately 3,000 spectators currently arrive and leave by private charter bus. In addition, private charter service from Santa Clara, San Mateo, Marin, and Sonoma counties will be initiated this season, replacing service previously provided by the VTA, SamTrans, and Golden Gate Transit, respectively. Routes and service are expected to be similar to that previously provided by those operators.

Bus Access and Parking: Buses from the north generally access the stadium by way of Ingerson or Jamestown Avenue, using the Third Street or Paul Avenue exits from US-101 southbound. Buses from the south access the stadium using the Third Street exit. Ingerson Avenue between Third Street and Giants Drive is exclusively used by buses, taxis, and emergency vehicles during pre- and post-game periods.

Southbound buses leaving the stadium generally use westbound Ingerson Avenue to southbound Third Street and take the southbound US-101 on-ramp at Bayshore/Third. Northbound buses use northbound US-101 via the on-ramp at Bayshore/Third. The special Muni shuttle to San Bruno/Bacon turns from Ingerson Avenue onto Third Street northbound, and left at Gilman/Paul. In general, buses operate inbound on Jamestown Avenue during the pre-game period and outbound on Ingerson Avenue during the post-game period.

Muni buses load and unload passengers along the drop-off roadway (Giants Drive) north of Jamestown Avenue. Other buses (including charters) load and unload in the main parking lot. Muni buses park free along the drop-off roadway (Giants Drive) parallel to Jamestown Avenue. All other buses park in the main parking lot. The buses in the main lot are parked end-to-end. As a result, some fully loaded buses after the game are delayed until the bus parked in front of them leaves.

Pedestrian Circulation

The number of pedestrians in the vicinity of the stadium is highest during post-game conditions with spectators exiting the stadium at once. The primary pedestrian flows are towards the internal and off-site parking areas east of the stadium, and towards the parking areas along Harney Way and Little Hollywood/Tunnel Avenue, and to the off-site lot along Jamestown Avenue and T-Third line on Third Street.

The two pedestrian overcrossings, one crossing Jamestown at Harney Way, and one crossing the drop-off loop (connecting with Jamestown Avenue approximately 350 feet north of Harney Way), are too narrow

to accommodate the surge of pedestrians leaving the stadium. Queues form at the approaches to the pedestrian overcrossings, particularly at Jamestown/Harney. This crossing has fences on either side of the sidewalk to channelize pedestrians and to prevent pedestrians from crossing Jamestown Avenue or Harney Way at-grade.

East of the stadium, pedestrian flows generally spread out throughout the internal lot, and cross Hunters Point Expressway at-grade along the roadway. These uncontrolled crossings often result in conflicts between pedestrians and vehicles, and police occasionally control these crossings. In September 2009, a pedestrian bridge was installed on Hunters Point Expressway at the location of the at-grade pedestrian crossing to the State Park parking lots.

Parking Conditions

Game day parking demand for 49er games at the existing stadium is accommodated within off-street surface parking lots and on-street parking adjacent to the neighborhood and to the west in the Little Hollywood neighborhood. Game day parking demand varies depending on attendance levels, and maximum demand occurs during sell-out games.

Parking for 49er games is provided within stadium parking lots, on state park land, and in satellite parking lots. A total of 18,880 off-street parking spaces are provided for a typical 49ers game, generally at a fee of $30 per auto. Approximately 48 percent of the off-street parking spaces are in the stadium parking lot (9,110 spaces for autos, buses, recreational vehicles, limousines, press and players), 23 percent are located in state park land lots (5,470 spaces), and 29 percent are located in satellite parking lots (4,300 spaces). In addition to the satellite parking lots, there are a number of parking spaces in private lots that are generally restricted for use by residents, customers, employees of private businesses, or public agencies; however, some of the spaces are made available to the public on football game days. The 49ers estimate that up to 3,000 spaces are available on private land for game day parking.

In addition to the off-street parking, nearby on-street parking is heavily used by football fans, particularly in the Little Hollywood neighborhood across from the stadium. During game day parking surveys, within the area bounded by US-101, Bayshore Boulevard and the County line, all on-street parking spaces were occupied (compared with 60 percent on a non-football Sunday), resulting in an inconvenience for residents. In the area northwest of the stadium, bounded by Third Street, Jamestown Avenue, Giants Drive/Arelious Walker Drive, and Carroll Avenue, on-street parking is about 86 percent occupied, compared to about 70 percent on a non-game Sunday; the increased occupancy rate is primarily due to reduced parking supply caused by game day parking prohibitions.

In general, many football spectators arrive up to five hours before kickoff to prepare and eat food and drink beverages near their vehicles in the parking lots. These "tailgate" parties take place in the car and RV parking lots. Based on previously collected information on stadium parking accumulation, on a typical game day, up to 40 percent of vehicles arrive between one and two hours prior to kickoff.

During game days, parking restrictions are implemented to increase traffic capacity in and out of the facility and to reduce congestion. On game days parking is prohibited between 10:00 A.M. and 6:00 P.M. on one or both sides of the following streets: Carroll Avenue, Gilman Avenue, Ingerson Avenue, Jamestown Avenue, Paul Avenue, and Third Street.

III.D.3 Regulatory Framework

This section provides a summary of the plans and policies of the City and County of San Francisco, and regional, state, and federal agencies that have policy and regulatory control over the Project site. These plans and policies include the San Francisco General Plan, the Better Streets Plan, the San Francisco Bicycle Plan, the San Francisco Bay Trail Plan, and the Transit First Policy.

Federal

There are no federal transportation regulations applicable to the Project.

State

The San Francisco Bay Plan was prepared by the San Francisco Bay Conservation and Development Commission (BCDC) pursuant to the McAteer-Petris Act of 1965 which established the Commission as a temporary agency to prepare an enforceable plan to guide the future protection and use of San Francisco Bay and its shoreline. The Bay Plan contains the following transportation policies that are relevant to the Project:

- Transportation Policy 1: Because of the continuing vulnerability of the Bay to filling for transportation projects, the Commission should continue to take an active role in Bay Area regional transportation and related land use planning affecting the Bay, particularly to encourage alternative methods of transportation and land use planning efforts that support transit and that do not require fill. The Metropolitan Transportation Commission, the California Department of Transportation, the California Transportation Commission, the Federal Highway Administration, county congestion management agencies and other public and private transportation authorities should avoid planning or funding roads that would require fill in the Bay and certain waterways.
- Transportation Policy 2: If any additional bridge is proposed across the Bay, adequate research and testing should determine whether feasible alternative route, transportation mode or operational improvement could overcome the particular congestion problem without placing an additional route in the Bay and, if not, whether a tunnel beneath the Bay is a feasible alternative.
- Transportation Policy 3: If a route must be located across the Bay or a certain waterway, the following provisions should apply:
    a. The crossing should be placed on a bridge or in a tunnel, not on solid fill.
    b. Bridges should provide adequate clearance for vessels that normally navigate the waterway beneath the bridge.
    c. Toll plazas, service yards, or similar facilities should not be located on new fill and should be located far enough from the Bay shoreline to provide adequate space for maximum feasible public access along the shoreline.
    d. To reduce the need for future Bay crossings, any new Bay crossing should be designed to move the largest number of travelers possible by employing technology and operations that increase the efficiency and capacity of the infrastructure, accommodating non-motorized transportation and, where feasible, providing public transit facilities.
- Transportation Policy 4: Transportation projects on the Bay shoreline and bridges over the Bay or certain waterways should include pedestrian and bicycle paths that will either be a part of the Bay Trail or connect the Bay Trail with other regional and community trails. Transportation projects should be designed to maintain and enhance visual and physical access to the Bay and along the Bay shoreline.

- Transportation Policy 5: Ferry terminals should be sited at locations that are near navigable channels, would not rapidly fill with sediment and would not significantly impact tidal marshes, tidal flats or other valuable wildlife habitat. Wherever possible, terminals should be located near higher density, mixed-use development served by public transit. Terminal parking facilities should be set back from the shoreline to allow for public access and enjoyment of the Bay.

Regional

There are no regional transportation regulations applicable to the Project.

Local

San Francisco General Plan

The Transportation Element of the San Francisco General Plan is composed of objectives and policies that relate to the nine aspects of the citywide transportation system: General Regional Transportation, Congestion Management, Vehicle Circulation, Transit, Pedestrian, Bicycles, Citywide Parking, and Goods Management. The Transportation Element contains the following objectives and policies that are directly pertinent to consideration of the Project:

- Use the transportation system as a means for guiding development and improving the environment. (Transportation Element Objective 2)
- Use rapid transit and other transportation improvements in the city and region as the catalyst for desirable development, and coordinate new facilities with public and private development. (Transportation Element Objective 2, Policy 2.1)
- Organize the transportation system to reinforce community identity, improve linkages among interrelated activities, and provide focus for community activities. (Transportation Element Objective 2, Policy 2.4)
- Improve bicycle access to San Francisco from all outlying corridors. (Transportation Element Objective 9)
- Where Bicycles are prohibited on roadway segments, provide parallel routes accessible to bicycles or shuttle services that transport bicycles. (Transportation Element Objective 9, Policy 9.2)
- Establish public transit as the primary mode of transportation in San Francisco and as a means through which to guide future development and improve regional mobility and air quality. (Transportation Objective 11)
- Develop and implement a plan for operational changes and land use policies that will maintain mobility and safety, despite a rise in travel demand that could otherwise result in system capacity deficiencies. (Transportation Element Objective 14)
- Ensure that traffic signals are timed and phased to emphasize transit, pedestrian, and bicycle traffic as part of a balanced multimodal transportation system. (Transportation Element Objective, 14, Policy 14.2)
- Improve transit operation by implementing strategies that facilitate and prioritize transit vehicle movement and loading. (Transportation Element Objective 14, 14.3)
- Reduce congestion by encouraging alternatives to the single-occupancy auto through the reservation of right-of-way and enhancement of other facilities dedicated to multiple modes of transportation. (Transportation Element Objective 14, Policy 14.4)

- Encourage the use of transit and other alternative modes of travel to the private automobile through the positioning of building entrances and the convenient location of support facilities that prioritizes access from these modes. (Transportation Element Objective 14, Policy 14.7)
- Establish a street hierarchy system in which the function and design of each street are consistent with the character and use of the adjacent land. (Transportation Element Objective 18)
- Design streets for a level of traffic that serves, but will not cause a detrimental impact on, adjacent land uses or eliminate the efficient and safe movement of transit vehicles and bicycles. (Transportation Element Objective 18, Policy 18.2)
- Discourage high-speed through traffic on local streets in residential areas through traffic "calming" measures that are designated not to disrupt transit service or bicycle movement…" (Transportation Element Objective 18, Policy 18.4)
- Improve the city's pedestrian circulation system to provide for efficient, pleasant, and safe movement. (Transportation Element Objective 23)
- Widen sidewalks where intensive commercial, recreational, or institutional activity is present and where residential densities are high. (Transportation Element Objective 23, Policy 23.2)
- Maintain a strong presumption against reducing sidewalk widths, eliminating crosswalks, and forcing indirect crossings to accommodate automobile traffic. (Transportation Element Objective 23, Policy 23.3)
- Ensure convenient and safe pedestrian crossings by minimizing the distance pedestrians must walk to cross a street. (Transportation Element Objective 23, Policy 23.6)
- Improve the ambiance of the pedestrian environment. (Transportation Element Objective 24)
- Provide secure and convenient parking facilities for bicycles. (Transportation Element Objective 28)
- Provide secure bicycle parking in new governmental, commercial, and residential developments. (Transportation Element Objective 28.1)
- Provide parking facilities which are safe, secure, and convenient. (Transportation Element Objective 28, Policy 28.3)
- Relate the amount of parking in residential areas and neighborhood commercial districts to the capacity of the city's street system and land use patterns. (Transportation Element Objective 34)
- Regulate off-street parking in new housing so as to guarantee needed spaces without requiring excesses and to encourage low auto ownership in neighborhoods that are well served by transit and are convenient to neighborhood shopping. (Transportation Element Objective 34, Policy 34.1)
- Permit minimal or reduced off-street parking for new buildings in residential and commercial areas adjacent to transit centers and along transit preferential street. (Transportation Element Objective 34, 34.3)
- Meet short-term parking needs in neighborhood shopping districts consistent with preservation of a desirable environment for pedestrians and residents. (Transportation Element Objective 35)
- Provide convenient on-street parking specifically designed to meet the needs of shoppers dependent upon automobiles. (Transportation Element Objective 35, 35.1)
- Assure that new neighborhood shopping district parking facilities and other auto-oriented uses meet established guidelines. (Transportation Element Objective 35.2)
- Make freeway and major surface street improvements to accommodate and encourage truck/service vehicles in industrial areas away from residential neighborhoods. (Transportation Element Objective 39)

The Project site is relatively isolated from the rest of the City, and the surrounding topography of the hills and the Yosemite Slough create a context with limited connections to the broader transportation network. Existing pedestrian volumes and bicycle activity in the Project vicinity are low throughout the day. Consistent with the objectives and policies of the General Plan, key goals of the Project are to prioritize walking, bicycling and transit travel, making these attractive and practical transportation options. The land use program and transportation program developed for the Project consists of strategies to contain as many trips as possible within Candlestick Point and Hunters Point Shipyard, and to maximize the usefulness of walking and bicycling, a parking plan designed to discourage the overall usage of private automobiles, increased transit service, and a Transportation Demand Management Plan. The following illustrate a few features of the Project designed to promote pedestrian, bicycle, and transit travel.

- The development pattern is designed to facilitate walking and cycling for internal trips, and bus service for trips elsewhere.
- Streets are designed to support a variety of travel modes at moderate to low speeds, and are arranged in a pedestrian-oriented grid of small blocks.
- All of the homes within each community are within a 15-minute walk of a transit stop, where frequent service would be available.
- New and improved transit service would be provided to the Project site.

Better Streets Plan

The *Better Streets Plan* (draft June 2008) focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming measures to increase pedestrian safety. The Project roadway cross-sections were designed to safely accommodate multi-modal transportation within the Project site, and include roadway and streetscape improvements on roadways outside of the Project site. Particular attention was paid to designing improvements that would support safe and smooth interaction between pedestrians, automobiles, and bicycles. The Project's street layout and roadway cross-sections are consistent with the *Better Streets Plan,* except in few locations where unique right-of-way constraints have placed severe constraints that limit wider sidewalks, such as along steep hillsides or the Bay shoreline.

San Francisco Bicycle Plan

The *San Francisco Bicycle Plan* describes a City program to provide the safe and attractive environment needed to promote bicycling as a transportation mode. The certification of the *San Francisco Bicycle Plan Final EIR* was affirmed by the Board of Supervisors in August 2009. The San Francisco Bicycle Plan identifies near-term improvements that could be implemented within the next five years, as well as policy goals, objectives and actions to support these improvements. It also includes long-term improvements, and minor improvements that would be implemented to facilitate bicycling in San Francisco. When the injunction to stop implementation of the *San Francisco Bicycle Plan* improvements that was issued on June 2006 by the Superior Court of California is lifted, implementation of near-term improvements would be contracted. The *San Francisco Bicycle Plan* includes five near-term and five long-term projects within the study area. Project improvements on Innes Avenue would overlap with Bicycle Plan Project 4-4: Innes Avenue Bicycle Lanes, however, Project improvements would be consistent with the Bicycle Plan.

San Francisco Bay Trail Plan

Refer to Section III.B (Land Use and Plans) regarding a description of the San Francisco Bay Plan and its application to the Project. The following information about the San Francisco Bay Plan is related to the Transportation analysis.

The 2005 Gap Analysis Study prepared by ABAG, for the entire Bay Trail area, attempted to identify the remaining gaps in the Bay Trail system, classify the gaps by phase, county and benefit ranking, develop cost estimates for individual gap completion, identify strategies and actions to overcome gaps, and present an overall cost and timeframe for completion of the Bay Trail system. Within the Project site, the 2005 Gap Analysis Study proposes to connect existing Bay Trail segments that are located north and south of the Project site by extending the trail along the waterfront of the Candlestick Point Recreation Area and through the Project site along HPS. The proposed trail would then connect to the existing trail north of the Project site along the India Basin shoreline.

The Gap Analysis Study also proposes an alternate, inland connection that is partially within the Project site, with the proposed trail traveling east along Gilman Avenue with the Project site, continuing north along Third Street that would ultimately connect to the existing waterfront portion of the trail near the India Basin via Yosemite Avenue/Carroll Avenue and Cargo Way.[112]

The Project would include the construction of the Bay Trail throughout the Project site, and support the proposed waterfront trail connection route within the Gap Analysis Study area, whereby the existing trail south of the Project site would ultimately connect to the existing northern trail along the India Basin shoreline. The Bay Trail would be accessible for pedestrians and bicyclists with connections to the existing and new parks, from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the CPSRA, Yosemite Slough, and HPS Phase II shoreline to India Basin. Refer to Figure III.B-3 (San Francisco Bay Trail Plan).

Transit First Policy

In 1998, the San Francisco voters amended the City Charter (section 16.102) to include a Transit-First Policy. The Transit-First Policy is a set of principles which underscore the City's commitment that travel by transit, bicycle, and one foot be given priority over the private automobile. These principles are embodied in the policies and objectives of the Transportation Element. All City boards, commissions, and departments are required, by law, to implement transit-first principles in concluding City affairs.

The proposed Project has been formulated to implement the City's Transit-First Policy by encouraging development that promotes use of public transit. Specifically, the Project's Transit Plan includes significant improvements to transit service in the Hunters Point Shipyard, Candlestick Point, and Bayview Hunters Point neighborhoods. Improvements include route extensions, increased frequencies on existing lines, extensions of proposed BRT service into the site, and new downtown express bus service. Furthermore, the development program and street grid is designed to encourage and facilitate walking to nearby transit stops.

[112] ABAG, *Gap Analysis Study: A Report on Closing the Gaps in the 500-mile Regional Trail System Encircling San Francisco Bay*, 2005. http://www.abag.ca.gov/bayarea/baytrail/gap-analysis.html (accessed online August 2, 2009).

III.D.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to transportation, but generally consider that implementation of the Project would have significant impacts on these resources if it were to:

D.a Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)

D.b Exceed, either individually or cumulatively, an LOS standard established by the county congestion management agency for designated roads or highways (unless it is practical to achieve the standard through increased use of alternative transportation modes)

D.c Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that causes substantial safety risks

D.d Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses

D.e Result in inadequate parking capacity that could not be accommodated by alternative solutions

D.f Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., conflict with policies promoting bus turnouts, bicycle racks, etc.), or cause a substantial increase in transit demand that cannot be accommodated by existing or proposed transit capacity or alternative travel modes

The transportation and circulation impact findings herein are also based on the following significance criteria used by the San Francisco Planning Department for the determination of impacts associated with a proposed project:[113]

D.g Traffic—In San Francisco, the threshold for a significant adverse impact on traffic has been established as deterioration in the LOS at a signalized intersection from LOS D or better to LOS E or LOS F, or from LOS E to LOS F. The operational impacts on unsignalized intersections are considered potentially significant if project-related traffic causes the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F and Caltrans signal warrants would be met, or causes Caltrans signal warrants to be met when the worst approach is already at LOS E or LOS F.

For an intersection that operates at LOS E or LOS F under existing conditions, there may be a significant adverse impact depending upon the magnitude of the project's contribution to the worsening of delay. In addition, a project would have a significant adverse effect if it would cause major traffic hazards, or would contribute considerably to the cumulative traffic increases that would cause the deterioration in LOS to unacceptable levels (i.e., to LOS E or LOS F).

The operational impacts on freeway mainline segments and freeway on-ramp merge and off-ramp diverge operations are considered significant when project-related traffic causes the level of service to deteriorate from LOS D or better to LOS E or LOS F, or from LOS E to LOS F. In

[113] Five of the study intersections are in the City of Brisbane. The level of service standard for all arterial streets within the City of Brisbane is LOS D, except for the intersections on Bayshore Boulevard at Old County Road and San Bruno Avenue, which shall not be less than LOS C.

addition, a project would have a significant effect on the environment if it would contribute substantially to congestion at unacceptable levels.

D.h Parking—Parking supply is not considered to be a part of the permanent physical environment in San Francisco.[114] Parking conditions are not static, as parking supply and demand varies day to night, day-to-day, month-to-month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel.

Parking deficits are considered to be social effects, rather than impacts on the physical environment as defined by CEQA. Under CEQA, a project's social impacts need not be treated as significant impacts on the environment. Environmental documents should, however, address the secondary physical impacts that could be triggered by a social impact (CEQA Guidelines § 15131(a)). The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, or noise impacts caused by congestion. The absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, may induce many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service in particular, would be in keeping with the City's "Transit First" policy. The City's Transit First Policy, established in the City's Charter Section 16.102 provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

The transportation analysis accounts for potential secondary effects, such as cars circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near the project site and then seek parking farther away if convenient parking is unavailable.

D.i Transit—The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or cause a substantial increase in operating costs or delays such that significant adverse impacts in transit service levels could result.

The project would also have a significant effect on the environment if it would increase transit travel times on a particular route such that existing (or proposed) headways could not be maintained based on the existing (or proposed) vehicle fleet.

D.j Pedestrians—The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

D.k Bicycles—The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.

D.l Loading—The project would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within the proposed on-site loading facilities or within convenient on-street loading zones, and if it

[114] Under California *Public Resources Code*, Section 21060.5, "environment" can be defined as "the physical conditions which exist within the area which will be affected by a Project, including land, air, water, minerals, flora, fauna, noise, and objects of historic or aesthetic significance."

would create potentially hazardous traffic conditions or significant delays affecting traffic, transit, bicycles or pedestrians.

D.m Emergency Vehicle Access—The project would have a significant impact on the environment if it would result in inadequate emergency vehicle access.

D.n Construction—Construction-related impacts generally would not be considered significant due to their temporary and limited duration. However, in circumstances involving large development plans where construction would occur over long periods of time, construction-related impacts may be considered significant.

Analytic Method

This section presents the methodology for developing No Project and Project conditions, and information considered in the travel demand and impact analysis. Specifically, in the following order:

1. Approach to impact analysis, including analysis year and comparison to No Project conditions;
2. Future 2030 baseline transportation improvements assumed for the analysis of both 2030 No Project and Project conditions;
3. Methodology for development of future year 2030 No Project conditions traffic forecasts;
4. Transportation improvements proposed as part of the Project and assumed to be completed, and were included in assessment of travel demand and impact analysis;
5. Methodology and results of the Project travel demand forecasts for the development program, and separately for events at the stadium and arena;
6. Methodology for assessing impact of traffic volume increases on transit travel times; and
7. Methodology for transit capacity utilization analysis.

1. Analysis Approach

The analysis of the Project was conducted for future year 2030 conditions. Year 2030 was selected as the future analysis year, since the San Francisco County Transportation Authority (SFCTA) travel demand model (SF-CHAMP) used in the analysis develops traffic and transit forecasts for cumulative development and growth through the year 2030. Often, analyses examine "Existing plus Project" and "Long-Term Future plus Project" conditions to assess the near- and long-term impacts of a project. However, because Project buildout is expected to occur over almost 20 years, a near-term plus project scenario would not materialize, and therefore, was not analyzed. In addition, the Project impact analysis was conducted for 2030 conditions, rather than existing conditions, to account for the substantial roadway and transit network and development changes associated with the Project that would occur over a period of about 20 years (Project construction initiated in 2011 and completed by 2029), and to account for the major changes to the area that are projected to occur. The Project impact analysis therefore represents a cumulative growth scenario for the year 2030 for non-Project generated growth and transportation network improvements accounted for in the No Project conditions, and includes growth from development that would occur with implementation of the Project.

Project impacts were assessed by comparing future year 2030 conditions with the Project ("Project") to 2030 No Project conditions ("2030 No Project"). The 2030 No Project condition includes development within Hunters Point Shipyard associated with approved Phase I, as well as buildout of the existing Hunters Point Shipyard Redevelopment Plan, which would be replaced by the Project. However, for purposes of defining and assessing effectiveness of proposed mitigation measures, the total effect of the Project was

considered (i.e., total vehicle, transit, bicycle and pedestrian trips generated by the Project were considered, not just the increase from the 2030 No Project condition which assumes development within the Hunters Point Shipyard component of the Project). Further, for purposes of determining the Project's contribution to cumulative impacts, the total Project effect was considered.

The Project was determined to have a significant traffic impact at an intersection if Project-generated trips would cause an intersection operating at LOS D or better under 2030 No Project conditions to operate at LOS E or LOS F, or intersections operating at LOS E under 2030 No Project conditions to deteriorate to LOS F conditions. At intersections that would operate at LOS E or LOS F under 2030 No Project conditions, and would continue to operate at LOS E or LOS F under Project conditions, the increase in Project vehicle trips were reviewed to determine whether the increase would contribute considerably to critical movements operating at LOS E or LOS F.

For freeway mainline and ramp analyses, locations where the Project would result in a change from LOS D or better under 2030 No Project conditions to LOS E or LOS F, or from LOS E or LOS F, with the Project are identified as Project impacts. At locations that would operate at LOS E or LOS F under 2030 No Project conditions, and would continue to operate at LOS E or LOS F under Project conditions, the Project trips, as a percentage of total traffic volumes on the facility were reviewed to determine whether the increase would contribute considerably to total volumes on the facility.

The Project was determined to have a significant impact if it would increase transit travel times such that additional transit vehicles would be required to maintain the proposed headways. This was assumed to be the case if either the Project's travel time increases to a particular route would be greater than ½ its proposed headway or if the number of required vehicles estimated using SFMTA's cost/scheduling model, which takes into account scheduled breaks and extra time built into schedules, increases by one or more vehicles with the addition of the Project characteristics. The Project would have a significant contribution to a cumulative impact if it was determined to have a significant Project impact. In a few circumstances, although no Project impact was identified, the Project contribution to the cumulative scenario was determined to be considerable when a transit line travels through intersections that would operate at LOS E or LOS F due to Project traffic.

The calculations that were used to determine the Project's contribution to cumulative impacts are contained in the appendices to the Transportation Study.

2. Future 2030 Baseline Transportation Improvements

In addition to improvements proposed by the Project, the analysis assumes completion of certain planned and reasonably foreseeable roadway and transit improvements in the Project vicinity that, although not part of the Project, could affect circulation. These improvements would be completed by the City and County of San Francisco directly or through development approvals.

Roadway Improvements

These improvements were identified as mitigation measures in the EIRs prepared for the Bayview Hunters Point Redevelopment Plan and the Visitacion Valley Redevelopment Plan, and implementation will be assured through conditions of approval placed on the development projects by the Planning Department and the San Francisco Redevelopment Agency.

- **Bayshore/Paul**—At this signalized intersection, as part of the Bayview Hunters Point Redevelopment Plan the signal will be changed from northbound and southbound Bayshore Boulevard operating with permitted left turns (left turns yield to oncoming traffic), to protected left turn movements with an exclusive signal phase.
- **Bayshore/Tunnel**—At this signalized intersection, the Visitacion Valley Redevelopment Plan calls for improvements to the signal-timing plan, to redistribute green time from the southbound left turn movement to the northbound/southbound through movements.
- **Bayshore/Arleta/San Bruno**—At this signalized intersection, the Visitacion Valley Redevelopment Plan calls for improvements to the signal-timing plan, to redistribute green time from the northbound left turn movement to the southbound through movement.
- **Bayshore/Leland**—At this signalized intersection, the Visitacion Valley Redevelopment Plan calls for improvements to the signal-timing plan, to redistribute green time from the northbound left turn movement to the northbound/southbound through movements. As part of this improvement, the westbound approach will be restriped to provide two travel lanes: a left-through lane and an exclusive right-turn lane.
- **Bayshore/Visitacion**—The Visitacion Valley Redevelopment Plan calls for reconfiguration of this signalized intersection to extend the southbound left turn pocket by 80 feet. As part of this improvement, the west-side Bayshore/Leland Muni bus stop would be relocated to the south of Leland Avenue.
- **Bayshore/Sunnydale**—The Visitacion Valley Redevelopment Plan calls for reconfiguration of this signalized intersection to extend the southbound left turn pocket by 100 feet. In addition, the Plan calls for improvements to the signal timing plan, to redistribute green time from the northbound/southbound left turn movements to the eastbound/westbound through movements. The westbound and eastbound approaches will be restriped to provide two travel lanes: a shared left-through lane and an exclusive right-turn lane.
- **Tunnel/Blanken**—The Visitacion Valley Redevelopment Plan calls for reconfiguration of this intersection to eliminate the all-way STOP-sign controls and install new traffic signal poles, masts and signal heads. In addition, the approaches to the intersection would be restriped to provide for two travel lanes for each approach.
- **Bayshore/Blanken**—At this signalized intersection, the Visitacion Valley Plan calls for restriping of the westbound approach of Blanken Avenue at Bayshore Boulevard to two lanes, to provide for an exclusive left-turn lane, and an exclusive right-turn lane.
- **Executive Park Improvements**—The Executive Park Property Owners are also required to make local roadway improvements when warranted by poor operating conditions. These include the following short-term and long-term improvements:
  - > Signalization of Harney Way/Executive Park Boulevard East
  - > Signalization and reconfiguration of Harney Way/Alana Way/Thomas Mellon Drive intersection
  - > Widening of Harney Way by one lane
  - > Signalization of Executive Park Boulevard West/Alana Way and the restriping of the southbound approach from one shared lane to one exclusive left lane and one exclusive right lane
  - > Widening of Alana Way by one lane and two lanes
  - > Signalization of Alana Way/Beatty Road

Two regional roadway improvements were included as part of the future year 2030 No Project and Project analysis. These improvements are currently being designed and analyzed to accommodate the travel demand associated with the areawide projects in both San Francisco and San Mateo counties. Implementation of these improvements would be based on fair-share funding measures through interjurisdictional study and cooperation, such as the ongoing interjurisdictional Bi-County Transportation Study effort led by the SFCTA. Within San Francisco, the Planning Department and the Redevelopment Agency will require project developer fair share contributions to these identified funding needs as a condition of development approval or as a condition of any Owner Participation Agreement. These regional roadway improvements are:

- **Geneva Avenue/Harney Way Extension**—Geneva Avenue, which currently ends at Bayshore Boulevard, would be extended east to meet Harney Way, improving east/west access in the area. The Geneva Avenue Extension would have three eastbound and three westbound travel lanes between Bayshore Boulevard and a new interchange with US-101. Currently, the nearest east/west access road is Blanken Avenue, which is designed as a neighborhood collector roadway and could not accommodate the additional east/west traffic generated by area projects. The lead agency for this Project is the City of Brisbane, with the Caltrans Project Study Report (PSR) expected to be completed in 2010.
- **New US-101 Interchange at Geneva/Harney**—In conjunction with the extension of Geneva Avenue east, the existing Harney Way interchange is proposed to be redesigned as a typical diamond interchange, subject to review and approval by Caltrans. Caltrans and the City of Brisbane are the lead agencies for this project, and a PSR is currently being prepared. Two alternatives are currently being assessed; one with Geneva Avenue/Harney Way crossing under US-101, and one with Geneva Avenue/Harney Way crossing over US-101.

  At the time the analysis was completed, the Geneva Avenue/Harney Way crossing of US-101 was proposed to have six lanes eastbound (three left-turn lanes and three through lanes) and six lanes westbound (three left-turn lanes and three through lanes), for a total of twelve lanes (refer to Appendix L of the Transportation Study). The intersections of the northbound and southbound ramps with Geneva Avenue/Harney Way would be signalized. For both alternatives, a new bypass to the existing northbound Third Street off-ramp would be constructed, with the intention of diverting traffic on the existing off-ramp from the northbound mainline and improving conditions at the weave section where the new proposed northbound on-ramp from Harney Way would join the mainline.

Transit Improvements

SFMTA has proposed changes to several of the lines that would serve the study area as part of its Transit Effectiveness Project (TEP). The TEP is a comprehensive review of Muni operations, with numerous proposals for service and street network changes to address issues related to reliability, travel times, and service areas. Service planning changes are budget-neutral, while additional funding will be required for capital needs (e.g., additional buses). SFMTA will pursue Proposition K funds and federal grants for capital funding. The changes affecting the study area include:

- Eliminating 19-Polk service to the Hunters Point Shipyard.
- Increasing frequency on the 24-Divisadero from 8.5 minutes in the AM peak hour and 10 minutes in the PM peak hour to 7.5 minutes in the AM and PM peak hours.
- Increasing frequency on the 44-O'Shaughnessey to 6 minutes in the PM peak hour.
- Increasing frequency on the 54-Felton from 30 minutes to 20 minutes in the AM and PM peak hours.

- Extending the 48-Quintara-24th Street from its current terminus at 25th Street and Connecticut Street in Potrero Hill into the Hunters Point Shipyard in order to offset the elimination of the 19-Polk service to Hunters Point Shipyard. Frequencies on the 48-Quintara-24th Street would be reduced from 12 minutes to 15 minutes in the AM and PM peak hours.
- Extending the 28L-19th Avenue Limited from its current terminus at the Daly City BART station up to Geneva Avenue, terminating just east of Mission Street. The 28L-19th Avenue Limited would maintain its current 10-minute frequency in the AM and PM peak hours.
- Extending/rerouting the T-Third light rail line north of the station at Fourth and King Streets. Currently the T-Third continues north along The Embarcadero, entering the Market Street subway just north of Folsom Street. As part of the Central Subway project, beginning in approximately year 2016, the T-Third line will continue north on Fourth Street, entering a new subway under Fourth Street just south of Harrison Street. The new terminus will be in Chinatown, below Stockton Street. The Central Subway operating plan calls for single-car trains at 7.5-minute frequencies during peak hours between Chinatown and Bayview, as well as a two-car short-line train between Chinatown and Mariposa Street operating at 7.5-minute frequencies.

While not included in the assumptions for future transit conditions, the objectives of the ongoing Bayshore Intermodal Station Access Study would complement the TEP improvements, as well as Project transit improvements. The SFCTA is conducting the Bayshore Intermodal Station Access Study to develop multi-jurisdictional consensus around a vision and conceptual design for new intermodal transit connections and passenger access to the Bayshore Caltrain Station. Multiple planning processes are proceeding to develop projects that would connect new transit services to the Bayshore Station, including an extension of the T-Third light rail line from its current nearby terminus, the extension of the BRT line to Hunters Point Shipyard, and a new local street connection across Bayshore Boulevard, the Caltrain tracks, and US-101 as a Geneva Avenue extension. The SFCTA is partnering with stakeholder agencies to develop the proposed station connections in a seamless fashion and to promote strong multimodal access to the station. The end result will be a set of conceptual designs for the station and the new connections to serve as a vision that the individual projects will implement as they progress through their planning and preliminary engineering phases.

Bicycle Improvements

The *San Francisco Bicycle Plan*, adopted in June 2009, identifies near-term improvements that could be implemented within the next five years, as well as policy goals, objectives and actions to support these improvements. It also includes long-term improvements, and minor improvements that would be implemented to facilitate bicycling in San Francisco. When the injunction to stop implementation of the Bicycle Plan improvements that was issued on June 2006 by the Superior Court of California is lifted, that implementation of near-term improvements would be contracted. Funds for Bicycle Plan improvements would be available from the State Bicycle Transportation Account and San Francisco Measure C funding. The SFMTA, the San Francisco Recreation and Park Department (SFRDP), the Port of San Francisco (Port), or the San Francisco Department of Public Works (under the direction of SFMTA or SFRPD), would implement improvements, depending on which entity has jurisdiction. The *San Francisco Bicycle Plan* includes six short-term projects within the study area:

- *San Francisco Bicycle Plan* Project 4-2: Cargo Way Bicycle Lanes will involve the installation of Class II bicycle lanes in both directions on Cargo Way between Third Street and Jennings Street. On-street parking on the south side of Cargo Way will be removed, and a Class II left-turn bicycle lane will be

installed on eastbound Cargo Way approaching Illinois Street and Amador Street. Cargo Way is not currently part of the citywide bicycle route network, and is under the jurisdiction of the Port.

- *San Francisco Bicycle Plan* Project 4-3: Illinois Street Bicycle Lanes would involve the installation of Class II bicycle lanes in both directions on Bicycle Route #5 on Illinois Street between 16th Street and Cargo Way. On-street parking on the east side of Illinois Street north of 22nd Street will be removed, and additional on-street parking spaces will be provided on Tennessee Street, 22nd Street, and 24th Street.
- *San Francisco Bicycle Plan* Project 4-4: Innes Avenue Bicycle Lanes will involve the installation of Class II or Class III bicycle facilities in both directions on Bicycle Route #68 on Innes Avenue between Donahue Street and Hunters Point Boulevard. Two options have been identified for this segment and a preferred option was not included in the Bicycle Plan Final EIR: Option 1 would add Class II bicycle lanes in both directions, and remove on-street parking on the south side of Innes Avenue between Hunters Point Boulevard and Earl Street, and on both sides of Innes Street between Earl Street and Donahue Street. Option 2 would be similar to Option 1, except for the segment from Hunters Point Boulevard to Earl Street, where sharrows would be added to the existing Class III bicycle route in both directions. There would be no parking or travel lane removals associated with Option 2 between Hunters Point Boulevard and Earl Street.
- *San Francisco Bicycle Plan* Project 5-4: Bayshore Boulevard Bicycle Lanes will involve the installation of Class II bicycle lanes in both directions of travel along most of Bayshore Boulevard between Cesar Chavez Street and Silver Avenue (Bicycle Route #25). Sharrows would be added in each direction between Cesar Chavez Street and approximately the beginning of the couplet split (i.e., at Jerrold Avenue). On-street parking will be removed on both sides of Bayshore Boulevard from the couplet split to Industrial Street, and one northbound lane will be removed beginning midblock between Helena and Industrial Streets. Sharrows will be added on northbound Bayshore Boulevard to Oakdale Avenue, Loomis Street, Barneveld Avenue, and Jerrold Avenue, and the northbound curbside bicycle lane from Helena Street to Marengo Street will be a shared transit and bicycle lane.
- *San Francisco Bicycle Plan* Project 5-5: Cesar Chavez Bicycle Lanes will involve the installation of Class II bicycle lanes in both directions on Bicycle Route #25 on Cesar Chavez Street between Kansas Street (near US-101) and Mississippi Street (near I-280). To accommodate the bicycle lanes, one of the two eastbound travel lanes will be removed.
- *San Francisco Bicycle Plan* Project 5-13: San Bruno Bicycle Lanes will involve the installation of Class II bicycle lanes in both directions on Bicycle Route #25 on San Bruno Avenue between Silver Avenue and Paul Avenue. To accommodate the bicycle lanes, on-street parking would need to be removed in the segment between Silliman Street and Silver Avenue.

The *San Francisco Bicycle Plan* includes 24 long-term improvements that are proposed to be designed and implemented citywide over time. These improvements would complete the bicycle route network envisioned in the Bicycle Plan, close network gaps, refine and rationalize the bicycle route network, and improve safety and the bicyclist experience. Five long-term improvements have been identified within the study area for further design, environmental review, and possible implementation. With the exception of the Bay Trail improvements which involve construction of a Class I off-street path, and Mendell Street which is currently a plaza, the long-term improvements generally involve implementation of Class II or Class III bicycle facilities. Design of these improvements would occur within the context of the bicycle route network, planned development characteristics, and roadway network configuration at the initiation of the design and review process for each improvement. The five long-term improvements include:

- Long-Term Improvement L-3: Bay Trail Improvements in the vicinity of Hunters Point
- Long-Term Improvement L-4: Bayview Transportation Improvements Project
- Long-Term Improvement L-11: Industrial St between Loomis St and Oakdale Ave
- Long-Term Improvement L-12: Jennings St between Cargo Way and Evans Ave
- Long-Term Improvement L-15: Mendell St between Oakdale Ave and Palou Ave

3. Development of Year 2030 No Project Conditions

Future year 2030 No Project conditions were developed via a two-step process which utilized (1) the SFCTA travel demand model (SF-CHAMP) to determine background transit ridership and traffic growth on study area roadways, and (2) traffic volume overlays to reflect traffic volume turning movements associated with nearby developments that are not fully reflected in the SF-CHAMP model output.

SF-CHAMP Model Growth Projections

Future year 2030 traffic volume forecasts were estimated based on cumulative development and growth identified by SF-CHAMP travel demand model. The SF-CHAMP model is an activity-based travel demand model that has been validated to existing conditions and can be used to forecast future transportation conditions in San Francisco, and is updated regularly. The model predicts person-travel based on assumptions of growth in population, housing units, and employment by mode for auto, transit, walk, and bicycle trips. The SF-CHAMP model also provides forecasts of vehicular traffic on regional freeways, major arterials and on the study area local roadway network considering the available roadway capacity, origin-destination demand and congested travel speeds.

The SF-CHAMP model travel demand estimates incorporate the Association of Bay Area Governments (ABAG) land use and socio-economic database and growth forecasts for the year 2030 (Projections 2007), which provide forecasts of economic and population growth for San Francisco, as well as for the remaining eight Bay Area counties. Within San Francisco, the San Francisco Planning Department is responsible for allocating ABAG's countywide growth forecast to each SFCTA Model Traffic Analysis Zone (TAZ), based upon existing zoning and approved plans, using an area's potential zoning capacity and the anticipated extent of redevelopment of existing uses. The increase in transit and vehicle trips between existing conditions and 2030 No Project conditions was based on a comparison between model output that represents existing conditions and model output for 2030 conditions.

Local Development Traffic and Transit Overlays

In the Project vicinity, several development proposals have recently been approved or are in environmental review. While these projects had been included as part of the growth projections in the SF-CHAMP model, to account for the localized effects of traffic and transit demand, the trip generation associated with those projects was extracted from the SF-CHAMP model output, and replaced by more detailed travel demand estimates used in the environmental review of these projects.

Those projects include the Visitacion Valley Redevelopment program (Visitacion Valley Redevelopment Program Final EIR), Hunters View (227-229 West Point Road EIR), Executive Park Development Plan (conversion of office space to residential, neighborhood serving retail and community space—EIR ongoing), and Brisbane Baylands. The 2030 No Project condition also assumes development within

Hunters Point Shipyard associated with the approved Phase I, buildout of the existing Hunters Point Shipyard Redevelopment Plan, and proposed development within India Basin. Travel demand associated with Hunters Point Shipyard and India Basin development was developed consistent with the methodology described below for the Project conditions. No new development was assumed for Candlestick Point in the 2030 No Project condition, as there are no previously approved plans for the area.

Sunday PM Peak Hour Traffic Forecasts

Since the SF-CHAMP model is a weekday travel demand model, future year Sunday PM peak hour conditions were estimated based on the net growth developed for the weekday PM condition. Weekday PM to Sunday PM conversion factors were developed for each intersection, based on the existing relationship between weekday PM and Sunday PM peak hour, as determined from existing traffic counts.

4. Transportation Improvements Proposed as Part of the Project

Roadway Improvements

The Project would include on-site and external transportation improvements. The internal street network and external roadway improvements were designed to support transit, bicycle and pedestrian circulation, as shown in Figure III.D-6 (Proposed Roadway Improvements). Proposed roadway improvements would include the following:

Harney Way Widening—The existing four-lane Harney Way would be widened to the north and south of its existing alignment, and would be rebuilt to contain between two and three travel lanes in each direction, turn pockets, two BRT-only lanes, Class I and Class II bicycle facilities, new sidewalks, as well as landscaped area. Initially, the roadway would be rebuilt as a new five-lane roadway (with right-of-way reserved for additional lane(s) to be built in the future as needed for increased traffic levels). There would be two lanes in each direction, with eastbound left-turn lanes at Thomas Mellon Circle and Executive Park Boulevard East and a westbound right-turn lane at the Executive Park Boulevard East intersection. Figure III.D-7 (Proposed Harney Way Widening—Initial Configuration) presents the initial phase of Harney Way widening. A Class II bicycle lane would be provided on the north side of the roadway, and a Class I bicycle path would be provided on the south side of the roadway. Two exclusive Bus Rapid Transit (BRT)[115] lanes would be constructed adjacent to the roadway on its north side. They would be separated from the roadway by a six-foot median that would widen to ten feet at the proposed BRT stops to allow for a passenger-loading platform. A BRT stop at the intersection of Harney Way and Thomas Mellon would serve the proposed Executive Park development. Six lanes would be constructed west of Thomas Mellon Drive to connect with the future modifications to the US-101 interchange. The BRT right-of-way has been designed to meet "rail ready" standards for future conversion to light rail, although such conversion is not contemplated in this Project. New traffic signals would be installed at these intersections. After games at the new 49ers stadium, left turns would be prohibited at the two Harney Way intersections with Thomas Mellon Drive and Executive Park Boulevard for a period to allow for the configuration of the roadway to change to four westbound auto lanes and one eastbound auto lane.

[115] Bus Rapid Transit (BRT) is an integrated system of facilities, services, and amenities that collectively improves the speed, reliability, and identity of bus rapid transit. BRT combines stations, vehicles, services, running ways (e.g., curb bus lanes, median busways, mixed-flow lanes), and Intelligent Transportation Systems (ITS) elements into an integrated system.

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-6 Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED ROADWAY IMPROVEMENTS

SOURCE: RHAA, 2009.

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FIGURE III.D-7

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED HARNEY WAY WIDENING – INITIAL CONFIGURATION

Under the final configuration, a portion of the landscaped area installed as part of the initial widening would be rebuilt to provide an additional lane from the proposed Harney Interchange east to Arelious Walker Drive, if necessary. Figure III.D-8 (Proposed Harney Way Widening—Ultimate Configuration) presents the final configuration of the Harney Way widening.

New and Improved Roadways—The street network proposed for Hunters Point Shipyard and Candlestick Point would be an extension of the existing grid of the adjacent Bayview neighborhood, using typical Bayview block sizes. Within Candlestick Point the extension and completion of the street network would enhance access between the existing neighborhoods and the existing and proposed waterfront park. Within Hunters Point Shipyard, the street grid would be aligned to focus on connections to the waterfront.

Streets would be designed as complete streets consistent with the Better Streets Plan (Draft for Public Review, June 2008) to enable safe access for all users[116]. Proposed techniques would include driveway access management; traffic calming features such as signage and striping, pedestrian bulbouts where feasible at intersections, and refuge islands; streetscape amenities including street furniture, lighting, and plantings; and other features that would facilitate a high-quality pedestrian and bicycle network consistent with San Francisco's "Better Streets" Plan.

The spine of the Project's street network would be a continuous arterial beginning in the northwest of Hunters Point and traveling south to Candlestick Point. The portion of the arterial within Hunters Point would incorporate Innes Avenue, Robinson Street, and Crisp Avenue. The portion of the arterial connecting Hunters Point and Candlestick Point would incorporate a new Underwood Avenue extension and an improved Ingalls Street and Carroll Avenue. The reconfigured Arelious Walker Drive on the western edge of Candlestick Point would connect to an improved Harney Way at the southernmost point of Candlestick Point.

The Hunters Point Shipyard and Candlestick Point arterial streets would function as the primary thoroughfares of the project, with generally perpendicular collector, parkway and park edge streets playing a subordinate role. BRT lanes would be on the north side of Harney Way before diverting through the Candlestick Point site, using the Yosemite Slough bridge to reach Hunters Point Shipyard. Automobiles would not be permitted to use the Yosemite Slough bridge except on game days, and would instead be routed via Carroll Avenue, Ingalls Street, Thomas Avenue, and Griffith Street. The local streets that form the balance of the street network would be Neighborhood Residential streets.

Hunters Point Shipyard would be served by a four-lane roadway extension of Thomas Avenue connecting to Arelious Walker Drive and Crisp Avenue via Griffith Street. Ingalls Street would contain two travel lanes and on-street parking/loading on both sides of the roadway. The existing portion of Thomas Avenue would be converted from a two-lane to a four-lane facility. On Thomas Avenue, parking would be retained on both sides of the roadway. Innes Avenue east of Donahue Street would be reconfigured to provide for two travel lanes in each direction and on-street parking on both sides of the roadway (this segment was recently constructed as part of HPS Phase I and contains one travel lane in each direction).

[116] Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages would be able to safely move along and across a complete street.

SOURCE: RHAA, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.D-8

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED HARNEY WAY WIDENING – ULTIMATE CONFIGURATION

Game Day Roadway Network—Several roadway lane configurations would be temporarily changed to allow for the efficient ingress and egress of auto traffic to and from the proposed 49ers stadium before and after games. These roadways include Innes Avenue, Robinson Avenue, and Fisher Avenue on the north side of the Hunters Point Shipyard; Crisp Avenue on the southern side of the Hunters Point Shipyard; Griffith Street, Thomas Avenue, and Ingalls Street between the Shipyard and Candlestick Point; and Arelious Walker and Harney Way on Candlestick Point. Additionally, the Yosemite Slough bridge would be opened to vehicular traffic during this period. The bridge would be able to carry four lanes of auto traffic before and after games. In all cases, a travel lane would be dedicated to the "off-peak" travel direction (away from the stadium pre-game and to the stadium post-game) for local traffic and emergency access vehicles. Traffic control officers would be stationed at major intersections.

Streetscape Improvements—Streetscape improvements are planned for several key Bayview Hunters Point roadways: Harney Way and Innes, Palou, Gilman, Ingerson, and Jamestown Avenues. These streets would serve as primary routes for pedestrians, bicyclists, transit riders, and drivers. They are proposed to enhance the safety and experience of road users and existing residents, and are consistent with San Francisco's "Better Streets" Plan.

Enhanced streetscape design, including street trees, sidewalk plantings, furnishings, and paving treatments would be designed to visually tie together the proposed Project with the greater Bayview neighborhood. Specific streetscape treatments would vary depending on existing right-of-way and traffic demands. Streetscape improvements would take into consideration visibility at STOP-sign controlled intersections.

Yosemite Slough Bridge—A new Yosemite Slough bridge would extend Arelious Walker Drive from Candlestick Point to Hunters Point Shipyard. The bridge would have an 81-foot-wide right-of-way and would contain a 40-foot-wide landscaped greenway, two 11-foot-wide BRT lanes, a sidewalk, and a Class I bicycle path. On 49ers game days, the 40-foot-wide landscaped area would be converted to four peak direction travel lanes for game day auto traffic. The Yosemite Slough bridge would not be used for vehicular traffic at any other time, including secondary events at the new stadium.

The Yosemite Slough bridge is a fundamental component of the proposed BRT service between Hunters Point Shipyard and points to the west, including Candlestick Point, the Bayshore Caltrain station, and the Balboa Park BART station. It would be a continuation of the dedicated right-of-way for BRT on Harney Way and through Candlestick Point that, along with signal priority to BRT vehicles, is essential to provide direct, fast and reliable BRT service, and is designed to be "rail ready" (not to preclude possible conversion to light-rail).

The bridge sidewalk and Class I bicycle path would provide a direct connection between Candlestick Point and Hunters Point Shipyard for pedestrians and bicyclists at all times, and would reduce the potential for conflicts between BRT vehicles and motorists, pedestrians and bicyclists.

During game days, the 40-foot-wide landscaped median would serve as the primary and most-direct route between the stadium parking areas and US-101. This route would minimize the intrusion of game day traffic onto local residential streets (by directing vehicles directly onto Harney Way) and reduce the duration of post-game congestion.

Other Off-site Improvements—The Project would include installation of new traffic signals at existing unsignalized intersections as part of the transit preferential treatment[117] on Palou Avenue, or when traffic volumes warrant signalization at:

- Palou Avenue and Griffith Street
- Palou Avenue and Hawes Street
- Palou Avenue and Ingalls Street
- Palou Avenue and Jennings Street
- Palou Avenue and Keith Street
- Palou Avenue and Lane Street
- Carroll Avenue and Ingalls Street
- Thomas Avenue and Ingalls Street
- Arelious Walker Drive and Carroll Avenue
- Arelious Walker Drive and Gilman Avenue
- Arelious Walker Drive and Ingerson Avenue
- Arelious Walker Drive and Harney Way
- Pennsylvania Avenue/25th Street
- Evans/Jennings/Middlepoint

At the intersection Evans/Jennings/Middlepoint, in addition to signalization, the Project would revise the existing lane configuration on the Evans Avenue and Jennings Street approaches.

- The Project would reconfigure the existing three travel lanes on Evans Avenue for both the eastbound and westbound approaches to provide a shared through and left-turn lane, a through lane, and a right-turn lane. Since there are no bicycle lanes or on-street parking, this reconfiguration of the existing lanes would not impact parking or bicycle travel.
- The Project would reconfigure the southbound approach of Jennings Street to Evans Avenue to provide a southbound left turn pocket, and a shared southbound through and right-turn lane. The reconfiguration of the southbound approach would require displacement of about 200 feet of on-street parking on the west side of Jennings Street, which would eliminate about 8 to 10 parking spaces.

At the intersection of Palou/Griffith/Crisp, in addition to signalization, the Project would revise the existing lane configuration on the westbound Crisp Avenue, eastbound Palou Avenue, and northbound Griffith Street approaches.

- The Project would reconfigure the intersection by removing the southwest leg of Crisp Avenue and creating limited access for the eastern block of Palou Avenue. The Crisp Avenue westbound approach would be restriped to provide two approach lanes, a left-turn lane, and a shared left/through/right lane.
- The Project would also reconfigure the northbound Griffith Street approach to provide two lanes, a shared left/through/right-turn lane, and a right-turn lane. Additionally, the eastbound approach of Palou Avenue would be reconfigured to provide two approach lanes, a left-turn lane, and a shared through and right-turn lane. The reconfiguration of the northbound approach would require

[117] Transit preferential street treatments include measures (e.g., transit-only lanes, traffic signal pre-emption, sidewalk bus bulbs) that would improve transit travel times and service by giving priority to transit vehicles when conflicts with cars occur.

displacement of about 200 feet of on-street parking on the east side of Griffith Street, which would eliminate about 8 to 10 parking spaces.

At the intersection of Carroll/Ingalls, in addition to signalization, the Project would revise the existing lane configuration on the westbound approach of Carroll Avenue, the southbound approach of Ingalls Street, and the eastbound approach of Carroll Avenue.

- The Project would reconfigure Carroll Avenue to provide two travel lanes and a bicycle lane in each direction. This would allow for a shared left turn and through lane, and a shared through and right turn at both the east- and westbound approaches. The southbound approach would be reconfigured to allow for two approach lanes: a left-turn lane, and a shared through and right-turn lane. The reconfiguration of the southbound approach would require displacement of about 200 feet of on-street parking/loading on the west side of Ingalls Street.

At the intersection of Thomas/Ingalls, in addition to signalization, the Project would revise the existing lane configuration on the westbound approach of Thomas Avenue.

- The Project would reconfigure the westbound approach of Thomas Avenue to Ingalls Street to provide two lanes, a left-turn lane, and a shared through and right-turn lane. Thomas Avenue would be reconfigured to provide two travel lanes in each direction and on-street parking on both sides of the street.

Transportation Management System—The Project would include a transportation management system. The system would include the installation and coordination of existing and new signals at over 30 intersections in the Project vicinity and the surrounding area using fiber-optic technology including several changeable message signs and lane use control signals on roadways with reversible lanes. A Transportation Management Center near the 49ers stadium site would operate the system on game days. The Transportation Management Center would be operated by SFMTA.

Transit Improvements

The Transportation Plan would include the following transit improvements, which were assumed as part of the future transportation system:

- Extension of existing Muni routes to better serve the Project site
- Increased frequencies on existing routes to provide more capacity
- Provision of new transit facilities and routes to the Project

New direct transit service is proposed to serve employment trips to downtown San Francisco. Connections to the regional transit network (BART and Caltrain) would serve employment centers in the South Bay and the East Bay. Many of the proposed transit lines would include transit priority systems that would use sensors to detect approaching transit vehicles and alter signal timings to improve transit efficiency. The proposed transit improvements are illustrated in Figure III.D-9 (Proposed Transit Improvements) and are described below:

- Three routes would be extended into the proposed Hunters Point Transit Center: the 24-Divisadero, the 44-O'Shaughnessy, and the 48-Quintara-24th Street.
- Frequencies on the 24-Divisadero would increase to 6 minutes in the AM and PM peak hours. Frequencies on the 44-O'Shaughnessey would remain at 6 minutes and frequencies on the 48-Quintara-24th Street would increase from 15 minutes to 10 minutes in the AM and PM peak hours.

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-9

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PROPOSED TRANSIT IMPROVEMENTS

- The Project would also extend the 29-Sunset from its current terminus near the Alice Griffith housing development, near Gilman Avenue and Giants Drive, into the proposed Candlestick Point retail area, and increase its frequency by reducing headways between buses from 10 minutes to 5 minutes during the AM and PM peak hours.
- The T-Third service between Bayview and Chinatown via the Central Subway would convert from one-car to two-car trains, but headways would remain unchanged. The ultimate service for the T-Third is under study by SFMTA as part of implementation of the Central Subway project, and may change. The information included in this study reflects discussions with SFMTA staff and the best available information at the time.
- The 28L-19th Avenue Limited would be extended to the Hunters Point Shipyard transit center. The 28L-19th Avenue Limited would travel along Geneva Avenue and the proposed Geneva Avenue extension to Harney Way. East of Bayshore Boulevard, the 28L-19th Avenue Limited would operate as BRT, traveling in exclusive bus lanes into the Candlestick Point area. The BRT route would travel through the Candlestick Point retail corridor, and cross over Yosemite Slough into the Hunters Point Shipyard transit center. Frequencies on the 28L-19th Avenue Limited would be increased, and headways between buses would be reduced from 10 minutes to 5 minutes.
- New CPX-Candlestick Express to downtown serving the Candlestick Point site, traveling along Harney Way (with potential stops at Executive Park), before traveling on US-101 toward downtown, terminating at or near the Transbay Terminal.
- New HPX-Hunters Point Shipyard Express to downtown serving the Hunters Point Shipyard site, traveling from the Hunters Point Shipyard Transit Center, along Innes Street, with stops at the India Basin and Hunters View areas, before continuing along Jennings Street, Cargo Way and Illinois Street to 25th Street, eventually entering I-280 northbound at 25th/Indiana. The HPX would continue non-stop to the Transbay Terminal in Downtown San Francisco.

For the purposes of this document, no assumptions were made about increasing frequencies at Caltrain's Bayshore Station below 30-minute headways, nor about extending Caltrain to downtown or having High-Speed Rail operate on Caltrain right-of-way and using Bayshore Station. Additionally, while SamTrans regional bus service connects the proximate area with the South Bay no assumptions were made for significant transit use of SamTrans.

Bay Trail, Blue Greenway, and Bicycle Circulation Improvements

The Project would include the construction of the regionally adopted Bay Trail in the southeastern portion of San Francisco, and incorporation of the Blue Greenway, a network of enhanced pedestrian and bicycle links in through the eastern portion of San Francisco to the waterfront. Trail improvements would include a pedestrian and bicycle trail along the shoreline with connections to the existing and new parks, from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the SRA, Yosemite Slough, and HPS shoreline to India Basin. The Bay Trail would be incorporated into the design of the parks.

Bikeways would provide connections within the Project and the surrounding neighborhoods and other parts of the City, including exclusive bikeways on the proposed Yosemite Slough bridge. Bicycle lanes would be provided along major roadways, consistent with City guidelines, and it is anticipated that as the street network develops, the bicycle facilities would be incorporated into the official Bicycle Route network. The Bay Trail would be extended along the entire Project waterfront. There would be bicycle parking in

each commercial parking facility and residential garages. New commercial buildings with at least 20,000 gsf of floor area, as well as other facilities and attractions would provide locker and shower facilities. Bicycle racks would also be installed in parks, and along the streetscape of commercial and some residential streets. The proposed bicycle facilities and Bay Trail improvements within Hunters Point Shipyard and Candlestick Point are presented in Figure III.D-10 (Project Bicycle Network and Bay Trail Improvements).

Pedestrian Circulation Improvements

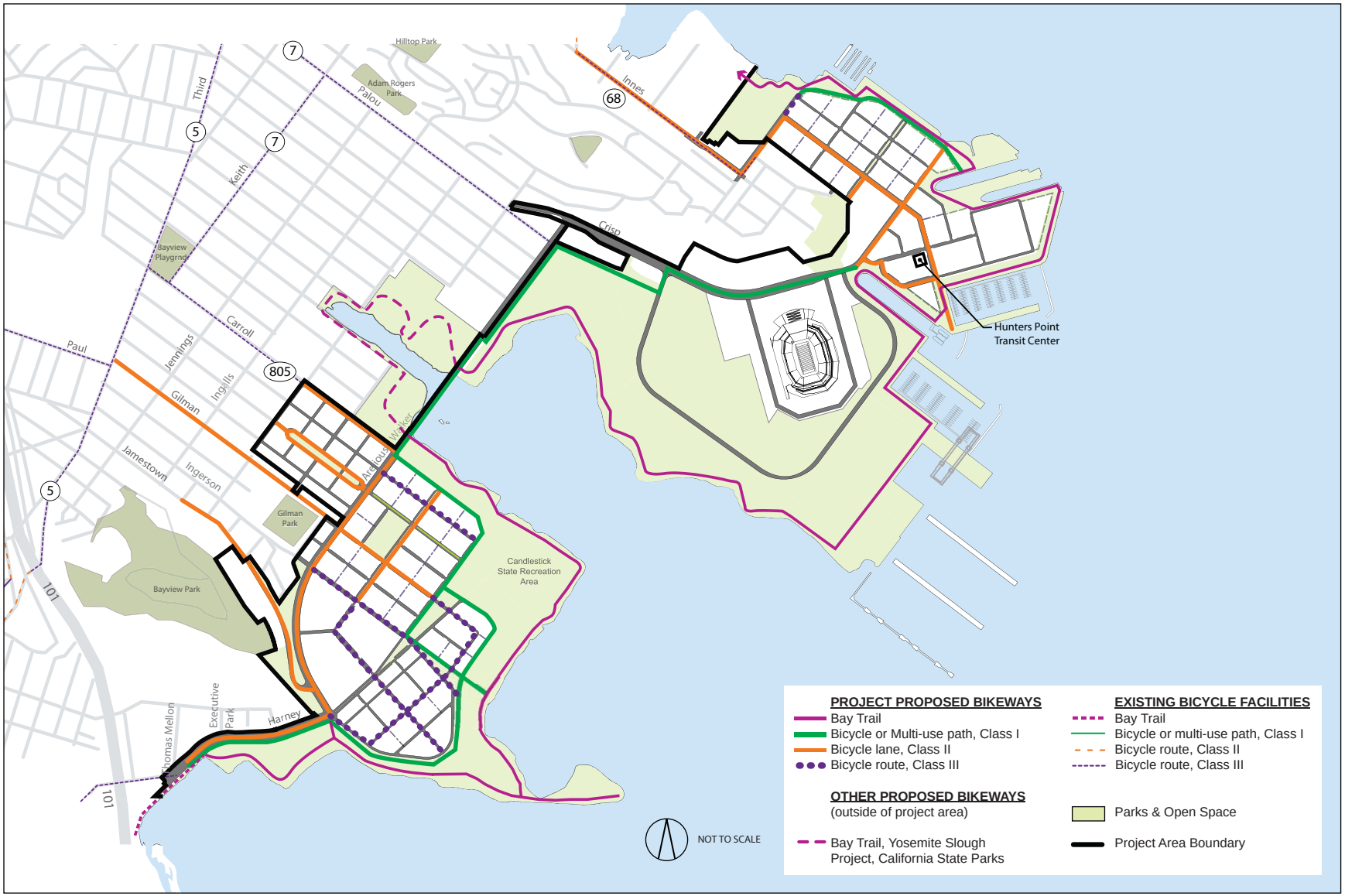
The pedestrian network would encourage walking as a primary mode of transportation within the Project site, and with separated pedestrian pathways, between Hunters Point and Candlestick Point on the Yosemite Slough bridge. Sidewalk and multi-use pathways would allow access to transit facilities and to shopping, schools, and recreation. The interior roadway network would include traffic calming features to facilitate safe pedestrian travel. The streets would be designed to accommodate multi modal travel with features including curb extensions, intersection bulb-outs, raised crosswalks, comprehensive signage, street trees, narrow roadway lanes, and short blocks and other features to slow auto traffic. All pedestrian facilities would meet *Americans with Disabilities Act* (ADA) standards and are designed to conform to San Francisco's "Better Streets Plan" wherever possible. The proposed pedestrian circulation plan for Candlestick Point and Hunters Point Shipyard is presented on Figure III.D-11 (Project Pedestrian Circulation Plan).

Travel Demand Management Plan

The Project would develop and implement a Transportation Demand Management (TDM) Program designed to reduce use of single-occupant vehicles and to increase the use of rideshare, transit, bicycle and walk modes for trips to and from, as well as within the Project. A draft TDM Program has been developed in consultation with SFMTA and the Planning Department and is available for review at the San Francisco Planning Department. The program would establish target goals, monitoring program, and a reporting program to SFMTA and the Agency. The TDM Program would highlight the demand management qualities of the overall Project, including:

- Jobs-Housing Linkage. By providing a range of job types (retail, research, hospitality, office, etc.) and a range of housing types from affordable apartments to single-family homes, the Project would maximize the potential jobs/housing "matches" on site. Each match reduces the number of vehicle trips that would enter and leave the Project site during peak hours.
- Streets designed for low speed and safe crossings. In addition to new residential and commercial buildings, the Project would provide new infrastructure, including streets. All new streets and intersection upgrades would consider the needs of pedestrians and bicyclists.
- Land uses and transit located to encourage walking. People walk more when destinations are within close proximity, along flat routes with easy street crossings, and through interesting areas with storefronts, street trees, street furniture, and other pedestrian-oriented amenities. The Project embraces these principles, with all homes located within a 15-minute walk of transit and neighborhood retail services integrated into residential blocks. Many existing neighborhoods would also benefit from their proximity to enhanced transit service, schools, retail locations, and jobs with the Project site.

The program would include a menu of TDM tools that, when employed, would make the most of the above design qualities of the Project TDM Plan. These include:



SOURCE: Fehr & Peers, 2010.

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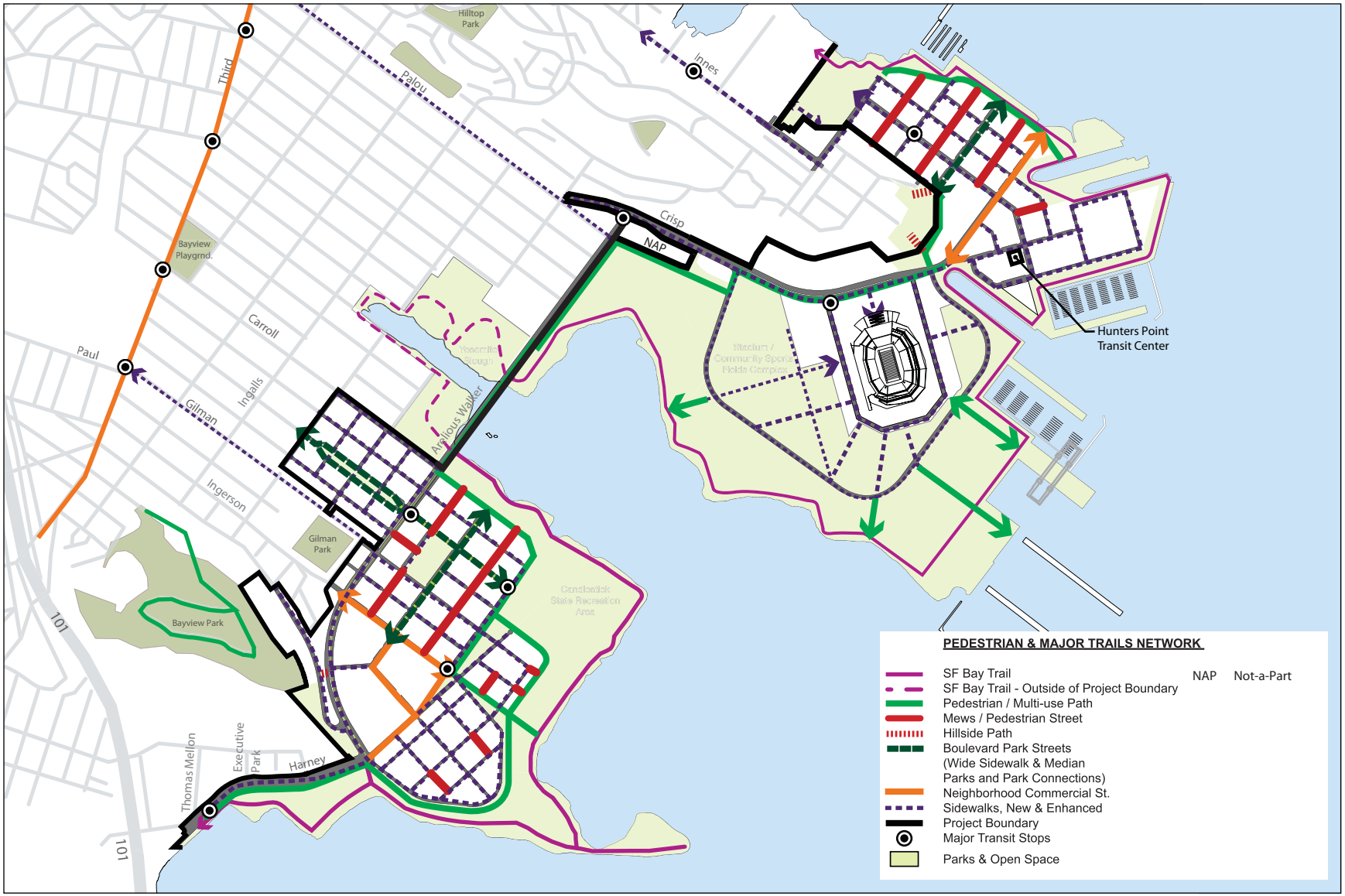
FIGURE III.D-10

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT BICYCLE NETWORK AND BAY TRAIL IMPROVEMENTS



SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-11

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT PEDESTRIAN CIRCULATION PLAN

Parking Strategies

- Visitor Variable, Market-Rate Parking Pricing. Visitor parking charges at variable market rates would encourage transit use. This can be accomplished by increasing parking rates during the peak period when transit service is most frequent, or increasing parking rates progressively to favor short-term parking over long-term parking, discouraging commuter parking.
- Maximum Permitted Parking Ratios. The Project includes a maximum permitted of one off-street parking space per residential unit, as well as maximum permitted ratios for other development types.
- Flexible Parking Management Strategies. Additional parking management strategies such as residential permit parking, time of day restrictions, parking technologies, and parking wayfinding would also be considered as needed to supplement other parking strategies.
- Unbundled Residential Parking. As required for all new residential developments with more than 10 units in San Francisco, residential parking would be "unbundled" and sold or leased separately from units. Unbundling parking makes the cost of parking visible to households, and may encourage some residents to save money by opting for a single off-street space or no dedicated parking. Unbundled parking would also serve as a "self selection" incentive for residents who prefer to live in car-free or car-reduced neighborhoods.

Transit Strategies and Support Strategies:

- Central Transit Hub. A transit center at Hunters Point Shipyard would enable efficient and convenient transfers while providing a central location for transportation brochures and other information to be distributed and for attended bicycle parking. Major BRT stops throughout the Project site would also include information kiosks and real-time transit updates.
- Enhanced Transit Service and Bicycle Facilities. Exclusive bike lanes and frequent bus rapid transit (BRT) service operating in dedicated lanes with signal priority, would offer convenient alternatives to driving to, from, and within the Project site. Additional transit service would include extended Muni routes, increased Muni frequencies, and enhanced connections to the regional network (BART and Caltrain).
- Bicycle Support Facilities. Bicycle support facilities to encourage bicycling would include parking facilities in both residential and commercial developments (such as racks, indoor/long-term parking, lockers, and showers), attended bicycle parking and repair facilities at major destinations (with discounted rental space for a bike station at the Hunters Point Shipyard Transit Center), and potentially a bike sharing or rental program.
- Wayfinding. A comprehensive wayfinding signage program would support the network of walkways and shared-use paths, encouraging pedestrian and bicycle trips.
- EcoPass. Homeowner's dues would include the cost of transit passes. The transit pass or "EcoPass" would offer significant benefits including a group discount (transit pass costs, while mandatory, would be priced significantly lower than individual passes because they are mandatory), a steady funding stream for enhanced transit service, and a "self selection" incentive—whereby more Eco-Minded (transit-inclined) residents would be attracted to live in the Project site.
- Carshare Services. Local carshare organizations would provide carshare vehicles throughout the Project site. Carshare services, such as City CarShare and ZipCar, allow members to use vehicles when needed, paying based on how much they drive. Employers may include carshare memberships for their employees as an element of their mandatory TDM Program. For multi-unit housing developments, carshare vehicles may be provided in residential garages.

- Employee TDM Programs. Employers of 20 or more employees in the Project site would be required to participate in TDM programs that would encourage the use of transit and facilitate walking and bicycling among their employees through both incentives and disincentives. Elements of the TDM programs may include:
  - > Information Boards/Kiosks. Employers would display transit routes and schedules; carpooling and vanpooling information; and bicycle lanes, routes, paths and facility information on information boards/kiosks or direct employees to web resources. "Real-time" monitors would be located near transit hubs, at outdoor transit shelters and inside lobbies, employment areas and other sheltered, well-lit areas where transit patrons can wait in relative comfort within immediate sightline of the transit stop or station.
  - > Commuter Benefits. The TDM program would include participation in the Commuter Benefits program for tax-free paycheck deductions of transit and bicycle commuter expenses.
  - > Employee EcoPass. Opportunities to provide employees with an "EcoPass" would be pursued, similar to the programs already underway at the University of California and the City of Berkeley. These passes would allow unlimited transit use and could be purchased at a discount bulk rate on a monthly and/or annual basis, and then be made available to all employees who work on the Project site.
  - > Carpool/Vanpools. Through their TDM program and in collaboration with the On-site TDM Coordinator, employers would offer carpool and vanpool matching services, subsidies, and priority accommodation. Designated and convenient spaces in parking facilities would be provided free to vanpools and carpools. The transit centers would also have designated signed areas for casual carpooling. Casual carpooling information would be provided through the On-site Coordinator's TDM website, brochures, and targeted marketing.
  - > Guaranteed Ride Home Program. A Guaranteed Ride Home program supported by employer participation would reimburse transit riders for return trip travel in the event of an emergency when an alternative means of travel is not available.
  - > Compressed Work Weeks, Flex Time, and Telecommuting. Through these strategies, employees would adjust their work schedule to reduce vehicle trips to the worksite.

Implementation and Monitoring Strategies

- CP-HPS Transportation Management Association. A Transportation Management Association (TMA) would be formed to develop, implement, operate, and administer strategies and programs to manage transportation resources in the Project and HPS Phase I, in accordance with the Project Transportation Demand Management Plan. The Transportation Coordinator (TC) team would act as staff to the TMA. The Board of Directors of the TMA representing private property owners would be established. The TMA would enter into Participation Agreements with property owners in the Project and HPS Phase I, setting forth the rights and obligations of each such owner relating to the programs and fees imposed by TMA.
- On-site Transportation Coordinator and Website. An On-site Transportation Coordinator would provide residents, employers, employees, and visitors with information regarding available transportation alternatives. The Transportation Coordinator would be responsible for implementation, monitoring, and improving on the measures of the TDM plan. The Coordinator would maintain a website to include transportation-related data and real-time transit information. The On-site Coordinator would serve as a liaison to City staff for all transportation concerns/communication needs.

- Targeted Marketing. From the day that the first employee comes in to work and the first family moves in, a plan would be in place to help people discover alternatives to driving alone in a car. The On-site Coordinator would be available to help people plan their trips and work with transportation agencies and others to promote transit, vanpooling, carpooling, and carsharing, bicycling, and walking. In addition to one-on-one outreach, TDM brochures and a website would be available on an ongoing basis. A yearly transportation options "fair" would also be scheduled for the neighborhood, with smaller outreach efforts available to employers and other organizations.
- Monitoring of Transportation Demand. The transportation measures and programs would all be monitored on an annual basis to determine the success of the programs and to allow the On-site Coordinator to make decisions about the allocation of resources or changes in the services that may be needed to better address the needs of the Project area. The objective of the monitoring would be to maximize the use of alternatives to the single occupant automobile and reduce peak hour congestion. A monitoring program could include user surveys, automobile counts, transit ridership, and bicycle and car share usage and costs.
- Monitoring Effectiveness of Congestion-Reducing and Traffic Calming Efforts. As part of annual monitoring, the On-site Coordinator would, in cooperation with SFMTA, review the effectiveness of the Project's transportation measures and other traffic calming measures implemented in the area to reduce congestion due to Project vehicle trips and minimize traffic spillover to neighboring residential streets. If warranted, the On-site Coordinator and SFMTA would consider implementation of additional traffic-calming and congestion-alleviating measures, such as adding additional lanes to the streets that approach Third Street, or other congested areas.

5. Project Travel Demand

This section presents the travel demand methodology and results for the Project development plan—i.e., the 10,500 residential dwelling, about 885,000 square feet of neighborhood- and regional-serving retail, and about 2,650,000 square feet of commercial office and R&D uses. Travel demand associated with sell-out 49er game and a secondary event at the stadium, as well as a sell-out event for the arena is also included in this section.

Project

The transportation effects associated with the travel demand generated by the Project land uses were determined by calculating the daily person-trips generated by the different types of Project land uses, and the portion of those trips that would occur during the peak hours analyzed. After determining the number of person trips generated by the Project, the trips were distributed to geographical origins/destination areas, including five San Francisco areas (downtown CBD, the rest of Superdistrict 1, Superdistrict 2, Superdistrict 3, Superdistrict 4) and three other regions in the Bay Area (South Bay, East Bay and North Bay)[118]. The mode split analysis then determined the portion of these trips made via automobile, transit, or any other mode of transportation, based upon the origin/destination of the trips, the purpose of the trips, and the availability of various modes. Finally, automobile occupancy rates were determined, to yield the average number of individuals in a vehicle, and, thus, determine the number of vehicles that would be traveling to and from the Project study area.

[118] Superdistricts are travel analysis zones established by the Metropolitan Transportation Commission (MTC). San Francisco is divided into four Superdistricts delineated to capture the different travel characteristics that are associated with the various street network, transit opportunities, and geographical constraints of different areas of San Francisco.

The methods commonly used for forecasting trip generation of development projects in San Francisco are based on person-trip generation rates, trip distribution information, and mode split data described in the Transportation Impact Analysis Guidelines for Environmental Review, SF Planning Department, October 2002 (*SF Guidelines).* These data are based on a number of detailed travel behavior surveys conducted within San Francisco. The data in the *SF Guidelines* are generally accepted as more appropriate than conventional methods because of the relatively unique mix of uses, density, availability of transit, and cost of parking commonly found in San Francisco. However, the methods describe in the *SF Guidelines* cannot be directly applied to the Project because of its large scale, specific location and distinctive character.

Similarly, standard trip generation rates, such as those provided by *Trip Generation,* 7th Edition, 2003, Institute of Transportation Engineers, would not be suitable for the Project, unless appropriate adjustments were made to account for the Project size, mix, and availability of transit.

To account for the trip-making patterns of this Project, a state-of-the-practice trip generation forecasting method was used in this analysis. This method was originally developed by Fehr & Peers and others for the US Environmental Protection Agency (EPA) and has been endorsed for use in project-specific and planning-level analyses by a number of jurisdictions, including the California Department of Transportation (Caltrans). This method is commonly referred to as the "4D" method, and generally accounts for the following factors that may influence travel behavior:

- Development scale—the amount of trips generated increases as the amount of development increases;
- Density of the project—the higher the project's density, the less vehicular traffic generated per unit of development;
- Diversity of uses—an appropriate mix of uses can lead to internalization of trips and trip-linking within a project; and,
- Design of project—a walkable, pedestrian- and bicycle-oriented circulation system can help to reduce automobile dependence within a project site.

The general concept behind the 4D method is that projects that deviate from a base case (in this case, ITE trip generation rates which represents a "national average") with respect to the four bulleted variables above exhibit different traffic generation patterns. Elasticities have been derived from travel behavior surveys from the Bay Area to help estimate how traffic generation changes as a function of changes in the 4Ds. Those elasticities are used to adjust the base case trip generation to account for the project's density, diversity, and pedestrian/bicycle friendliness (i.e., design) compared to typical suburban developments reflected in the ITE trip generation rates. Applying the 4D method results in a percentage reduction in vehicular traffic generation from the base case (i.e., ITE *Trip Generation*).

The travel demand analysis assumes implementation of the Project's improvements to transit service and a travel demand management (TDM) program, as described above. The transit improvements would be in addition to those currently proposed as part of SFMTA's Transit Effectiveness Program.

Project Trips by Mode

Table III.D-4 (Project Person and Vehicle Trips by Mode) summarizes the Project peak hour person-trips and vehicle trips during a typical weekday and Sunday. Between 28 and 34 percent of weekday AM and

PM peak hour person-trips would be internal/linked trips that would remain within the Project site and would occur primarily by walking and bicycling. External trips would occur via auto, transit, and bicycle modes; approximately 76 percent of peak hour external trips would occur by auto, 21 percent by transit, and 3 percent by bicycling. During the Sundays PM peak hour, fewer trips would be internal to the Project site, and fewer trips would occur via transit. On Sundays between 20 and 33 percent of trips would be internal/linked. Of the external trips, between 79 and 82 percent would be by auto, between 15 and 18 percent by transit, and about 3 percent by bicycle mode.

Table III.D-4 Project Person and Vehicle Trips by Mode

		Person Trips					
		Auto	*Transit*	*Bicycle*	*Internal/Linked*	*Total*	*Vehicle Trips*
Weekday AM Peak							
Hunters Point Shipyard		3,078	845	121	1,789	5,833	1,924
Candlestick		3,696	966	144	2,942	7,748	2,310
	Total	***6,774***	***1,811***	***265***	***4,731***	***13,581***	***4,234***
Weekday PM Peak							
Hunters Point Shipyard		3,463	1,001	138	1,839	6,441	2,164
Candlestick		7,861	1,889	302	3,920	13,972	4,913
	Total	***11,324***	***2,890***	***440***	***5,759***	***20,413***	***7,077***
Sunday PM Peak							
Hunters Point Shipyard		2,674	518	99	1,548	4,839	1,666
Candlestick		7,460	1,379	273	4,176	13,288	4,663
	Total	***10,134***	***1,897***	***372***	***5,724***	***18,127***	***6,329***

SOURCE: Fehr & Peers

Project Trip Distribution

Table III.D-5 (Project Weekday AM and PM Peak Hour Distribution Patterns) presents the distribution of the weekday AM and PM transit and vehicle trips to and from San Francisco and areas outside of San Francisco. Project trip distribution was based on information obtained from the SF-CHAMP model for the Traffic Analysis Zones included within the Project boundaries. During the weekday AM and PM peak hours, the majority of transit trips and about half of vehicle trips would occur within the boundaries of San Francisco, with a greater portion of work trips occurring by transit than non-work trips. Within San Francisco, the greatest number of trips would occur between the Project site and Superdistrict 3. Superdistrict 3 is the southeast quadrant of San Francisco and is bounded by the San Mateo County line to the south and San Francisco Bay to the east, and reaches westward to incorporate the Twin Peaks area. For trips outside of San Francisco, the majority would be to and from nearby Brisbane, Daly City, San Bruno and South San Francisco. Sunday trip distribution patterns would be similar to those presented for weekday PM peak hour conditions.

Table III.D-5 Project Weekday AM and PM Peak Hour Distribution Patterns

	Transit Trips			*Vehicle Trips*		
	Work	***Non-Work***	***Total***	***Work***	***Non-Work***	***Total***
Weekday AM Peak						
Downtown CBD	17%	10%	15%	1%	2%	2%
Rest of Superdistrict 1	19%	11%	17%	2%	3%	2%
Superdistrict 2	12%	11%	11%	9%	6%	8%
Superdistrict 3	26%	39%	29%	35%	41%	37%
Superdistrict 4	8%	4%	7%	5%	2%	4%
Total San Francisco	*82%*	*75%*	*79%*	*52%*	*54%*	*53%*
Brisbane, Daly City, Colma, San Bruno, South San Francisco	11%	20%	13%	21%	32%	26%
Rest of South Bay	3%	4%	4%	7%	5%	6%
East Bay	4%	1%	4%	17%	8%	13%
North Bay	0%	0%	0%	3%	1%	2%
Total	***100%***	***100%***	***100%***	***100%***	***100%***	***100%***
Weekday PM Peak						
Downtown CBD	26%	10%	19%	2%	2%	2%
Rest of Superdistrict 1	23%	11%	18%	3%	3%	3%
Superdistrict 2	11%	11%	11%	10%	6%	8%
Superdistrict 3	18%	40%	27%	28%	44%	38%
Superdistrict 4	5%	5%	5%	4%	3%	3%
Total San Francisco	*83%*	*77%*	*80%*	*47%*	*58%*	*53%*
Brisbane, Daly City, Colma, San Bruno, South San Francisco	10%	18%	13%	22%	30%	27%
Rest of South Bay	3%	4%	4%	8%	5%	6%
East Bay	4%	1%	3%	19%	7%	11%
North Bay	0%	0%	0%	4%	1%	2%
Total	***100%***	***100%***	***100%***	***100%***	***100%***	***100%***

SOURCE: Fehr & Peers

Stadium and Arena

The number of person-trips made by spectators to the proposed football stadium and the arena was estimated based on the proposed number of seats and a sell-out condition. For the stadium, travel demand is also presented for a smaller secondary event with an attendance of about 37,500 spectators.

49ers Game Day Travel Demand at the Proposed Stadium

As noted above, 49er game day travel demand estimates were based on a sellout game, when all 69,000 seats are sold. The number of person-trips made by spectators was estimated based on the number of seats proposed for the new stadium, less the average number of "no-shows." Information provided by the San Francisco 49ers indicates that with a 69,000-seat stadium, there would be approximately 3,450 "no-shows"

per game (an average 5 percent), resulting in an actual attendance of 65,550 for a sellout game. In addition to the 65,550 spectators, the 49ers have indicated that currently up to 725 game operations/media personnel attend home games, and that approximately 2,610 other game day employees (concessions, security, janitorial, etc.) are on site each game, for a total on-site population of 68,885 people for a sell-out game.[119]

With the relocation of the stadium and provision of new transit service proposed by the Project, the mode of travel to the stadium is expected to change compared to existing conditions, with increased use of transit. Based on existing attendance data obtained from the 49ers and SFMTA, 81 percent of the spectators arrive via automobile, and the remaining 19 percent come by transit, including 11 percent on Muni, 5 percent on SamTrans, Santa Clara Transit and Golden Gate Transit,[120] and the remaining 3 percent come by other private charter service. Although mode split can vary from game to game, these percentages represent average game day conditions. As noted above, in light of the new transit service proposed by the Project, a modest rise in transit use (from 19 percent to 25 percent) to the stadium was assumed to occur. Given the extent of transit improvements and demonstrated evidence from other locations that the NFL would consider transit as a means to reach games, this increase is a reasonable assumption. This analysis assumes that game operations staff and media personnel would likely use autos. Other game day employees are likely to use transit in a similar ratio as patrons (i.e., 25 percent). In addition to the existing game day transit service provided by Muni and charter bus service, the following transit service was assumed in the travel demand estimates:

- Harney Way BRT. The new express service would run in dedicated bus lanes from the proposed stadium site to key points west and south. This would greatly improve pre-and post-game transit running times as buses would bypass congested traffic conditions on Harney Way. The BRT service would also offer efficient and convenient access to regional transit service, such as Caltrain and BART.
- Palou Avenue Transit Preferential Street. On game days Palou Avenue would be a dedicated transit-only street to allow buses to proceed to the T-Third light rail line and points west and north without mixing in congested pre- and post-game traffic.
- Extension of Existing Transit Routes. In addition to operating "game day express" bus routes from strategic locations throughout San Francisco consistent with current game-day operations, the Project transit plan calls for extending several existing Muni bus routes (i.e., 24-Divisadero, 44-O'Shaughnessy, and 48-Quintara-24th Street) to provide regular service into the Project site. This service would be part of regularly scheduled service and would not be special game day service. As a result, patrons would be expected to be familiar with the routes.

Table III.D-6 (Projected Football Game Day Trip Generation by Mode) summarizes the number of people on-site by mode of access, and the number of post-game transit and vehicle trips associated with a sell-out game. The number of vehicle trips was determined by dividing the number of attendees that arrive via auto by the vehicle occupancy rate (VOR). Average VORs not only vary by type of vehicle but can also tend to vary depending on the type of stadium seating. For example, existing San Francisco 49ers data indicate that the average VOR for spectators in the club seating sections is 2.0, while the average VOR for spectators in the general seating sections is 3.0.

[119] The number of game operations/media personnel and other game day employees is expected to remain similar with a new stadium at Hunters Point Shipyard.
[120] In 2008 and 2009, game day SamTrans, Golden Gate Transit, and VTA transit service have been replaced with private charter. Ridership is expected to remain similar.

Table III.D-6 Projected Football Game Day Trip Generation by Mode

		Attendees by Mode	*Vehicle Trips*	*Transit Trips*
Spectators				
Auto		49,162	18,135	—
Charter Bus		3,656	—	3,656
Transit		12,732	—	12,732
	Subtotal	*65,550*	*18,135*	*16,388*
Employees/Media				
Auto		2,683	2,000	—
Transit		653	—	653
	Subtotal	*3,336*	*2,000*	*653*
	Total	***68,886***	***20,135***	***17,041***

SOURCE: Fehr & Peers.

The number of vehicles exiting the Project site following a game was determined based on the parking constraints associated with limiting game day off-street parking supply to 17,415 parking spaces, and variable factors such as game score, weather, traffic conditions, and the post game activities. An additional factor is the potential synergy after the football game between the stadium and the regional retail development at Candlestick Point, which may result in more spectators electing to stay later than currently do at Candlestick Park.

As noted above, the off-street parking supply dedicated for a football game would be 17,415 spaces, of which 340 spaces adjacent to the stadium would be reserved for buses, and the remaining 17,075 would be for private autos, RVs, limos, etc. Of the 17,075 spaces, 16,075 spaces would be adjacent to the stadium and the R&D development, and 1,000 spaces would be provided in Candlestick Point within a parking structure. As a result, 3,059 vehicles of the total unconstrained demand of 20,134 would not be able to park on-site on game days. These vehicles would likely park in other off-site parking lots and either walk or take transit into the stadium area. Therefore, although the demand for travel to the Project site on game days would be 20,134 vehicles, the actual amount that would park within the Project site on game days would be constrained by the 17,075 total parking spaces provided for game day spectators and/or employees.

Therefore, for a sell-out game, the vehicle exiting demand for the hour immediately following the end of the game would roughly range between 14,500 vehicles if there are some early and some late departures, and 17,100 vehicles if everyone attempted to leave at the end of the game. A typical end time for a Sunday football game is 4:00 P.M.

The geographic distribution of spectators was obtained from information provided by the San Francisco 49ers on their season ticket holders. Since the vast majority of football spectators are season ticket holders, the pattern can be expected to be representative of travel patterns by both season, as well as non-season, ticket holders. The information obtained from the 49ers indicates that approximately 40 percent of the season ticket holders reside in the South Bay (including all of San Mateo County), 16 percent in the East Bay, 14 percent within San Francisco, and 10 percent in the North Bay counties. The remaining 20 percent reside in locations outside the Bay Area such as the Central Valley and Sacramento.

Secondary (Non-Football) Events at the Proposed Stadium

It is anticipated that other types of events, such as soccer games or concerts, may also be scheduled at the stadium. A typical secondary event at the new stadium could occur at any time of day and on any day of the week, with an expected crowd ranging from 15,000 (e.g., monster truck rally) to sell-out conditions. For purposes of the transportation analysis, an event with 37,500 spectators was analyzed, which reflects events such as a Metallica concert. Assuming an approximate weekday evening start time of about 7:00 P.M., the weekday PM peak hour (5:00 to 6:00 P.M.) was analyzed for pre-event conditions to address transportation impacts associated with possible secondary events on evening commute traffic conditions. Secondary events would be limited to 20 total occurrences per year.

Unlike football games, where there would be special transit service to the stadium, it is assumed that for secondary events only regularly scheduled transit service would be provided by Muni and only a small percentage of private charter buses would be expected. However, the amount of regularly scheduled PM peak period transit service serving the new stadium would be substantial, such that transit mode share for a secondary event at the stadium would be about 25 percent. It is estimated that the 37,500 spectators would generate about 28,125 persons coming by autos, and 9,375 persons taking transit, including regularly scheduled service and charter buses. Assuming that the average number of spectators per auto for a secondary event would be similar to that for football spectators in the general seating section (i.e., 3 spectators per auto), the 28,125 persons taking autos would translate to 9,375 vehicles to the stadium, and up to 10,100 vehicles including employees.

Based on a technical paper on major event traffic (ITE, 1997), it was assumed that approximately 25 percent of the total number of spectators at a secondary event would arrive within the one hour prior to the event start time, 50 percent would arrive within the second hour, and the remaining 25 percent would arrive within the third hour prior to the event start time. As such, about 50 percent, or 4,688 of the spectator vehicles would arrive between 5:00 and 6:00 P.M. for a weekday evening event starting at 7:00 P.M. Employees would arrive to the site earlier than 5:00 P.M.

The geographic distribution of trips associated with a secondary event would vary depending on the event. However, for the purposes of this transportation analysis, it was assumed that the geographic location of the secondary event spectators would be similar to that of the football spectators, where approximately 40 percent would come from the South Bay, 16 percent from the East Bay, 14 percent from within San Francisco, 10 percent from the North Bay, and 20 percent from locations outside of the Bay Area.

Events at the Proposed Arena

The Project also includes a new 10,000-seat arena within Candlestick Point that would be used for theater productions, concerts, speaking engagements, educational events, or sporting events, while most events at the arena would be for smaller audiences. It is anticipated that up to 150 events per year could occur at the arena (e.g., Wednesday, Friday, and Saturday every week per year). Similar to the analysis of secondary events at the stadium, assuming an approximate weekday evening start time of 7:00 P.M., the weekday PM peak hour (5:00 to 6:00 P.M.) was analyzed for pre-event conditions to address transportation impacts associated with sold-out events that may occur at the arena. Although no specific program has been developed for events at the arena, sell-out events with 10,000 attendees occurring during weekday evenings would likely be infrequent.

The analysis of a sold-out event at the arena assumes that only regularly scheduled transit service would be provided and that only a small number of attendees would arrive by private charter bus. The analysis assumes that 20 percent of attendees would arrive by transit. Therefore, of the 10,000 spectators, 2,000 would be expected to arrive by transit and 8,000 would be expected to arrive via auto. Assuming that the average vehicle occupancy for a sold-out event at the arena would be similar to that of spectators to a 49ers game or for a secondary event at the stadium (i.e., 3 spectators per auto), the 8,000 people arriving via auto would generate an additional 2,667 vehicles to the stadium, and up to 2,860 vehicles including employees (assuming similar ratios of employees to spectators as football game days).

Arrival and departure patterns for a sold-out event at the arena would likely be similar to those of secondary events at the stadium. It was assumed that 50 percent of the attendees, or 1,333 vehicles and 1,000 transit trips, would arrive between 5:00 and 6:00 P.M. for an event that begins at 7:00 P.M. Employees would arrive earlier and would not affect the 5:00 to 6:00 P.M. peak hour.

Similar to secondary events at the stadium, the geographic distribution of trips associated with events at the arena would vary depending on the event. For purposes of this analysis, it was assumed that the geographic location of the attendees would be similar to that of the football spectators, with 40 percent of attendees arriving from the South Bay, 16 percent from the East Bay, 14 percent from within San Francisco, 10 percent from the North Bay, and 20 percent from locations outside the Bay Area.

Parking Demand

The *SF Guidelines* methodology for estimating parking demand was used to calculate the parking demand associated with the land uses for each analysis scenario. Parking demand was estimated separately for residential and non-residential uses as follows:

- Residential Parking Demand—For individual development projects, residential parking demand is estimated based on the number and type of housing unit (i.e., studios/one bedroom versus two and two-plus bedroom units, and affordable versus market rate housing) that would be constructed.
- Non-Residential Parking Demand—Non-residential demand was estimated for both short-term and long-term demand. Long-term demand refers to demand generated by employee trips by auto, while short-term demand refers to demand associated with visitor trips. Long-term demand was calculated by applying the vehicle mode choice by Project subarea to the projected number of new employees associated with each land use. Average hour short-term demand was calculated by applying an average turnover of 5.5 vehicles per space to the daily non-work trips by vehicle (one-way trips).

Table III.D-7 (Project Parking Demand) presents the residential and non-residential parking demand for the Project. The parking demand excludes the stadium and arena event demands presented in the previous section.

Table III.D-7 Project Parking Demand

	Residential	*Non-Residential*		
Project Area	*Long Term Demand*	*Long Term Demand*	*Short-Term Demand*	*Total Demand*
Hunters Point Shipyard	3,110	3,818	996	7,924
Candlestick Point	9,212	1,475	2,622	13,309
Total	***12,322***	***5,293***	***3,618***	***21,233***

SOURCE: CHS Consulting, LCW Consulting

Loading Demand

The *SF Guidelines* methodology for estimating commercial vehicle and freight loading/loading demand was used to calculate the demand associated with each analysis scenario. Daily truck trips generated per 1,000 square feet were calculated based on the rates contained in the *SF Guidelines*, then converted to hourly demand based on a 9-hour day and a 25-minute average stay. Average hourly demand was converted to a peak hour demand by applying a peaking factor, as specified in the *SF Guidelines*. Table III.D-8 (Project Loading Demand) presents the number of trucks generated by the Project land uses on a daily basis, and the demand for loading dock spaces during the peak hour of loading activities.

Table III.D-8 Project Loading Demand

Project Area	*Daily Truck Generation*	*Peak Hour Loading Dock Space Demand*
Hunters Point Shipyard	713	41
Candlestick Point	507	29
Total	***1,220***	***70***

SOURCE: LCW Consulting.

6. Transit Delay Methodology

Project impacts to transit measured in terms of increases to transit travel times on routes serving the Project vicinity which would be most likely affected by congestion associated with Project-generated vehicle trips. The analysis evaluated the increases to transit travel times associated with the following three influencing factors.[121]

- **Traffic congestion delay**—Traffic congestion associated with increases in area traffic slow down transit vehicles and results in increased transit travel times. Traffic congestion delays were calculated by summing the average vehicular delay at each intersection along the transit line's route within the study area. The increase in total route segment delay is equal to the increase in travel time associated with the Project.
- **Transit re-entry delay**—Transit vehicles typically experience delays after stopping to pick up and drop off passengers while waiting for gaps in adjacent street traffic in order to pull out of bus stops. As traffic volumes on the adjacent street increase, re-entering the flow of traffic becomes more difficult and transit vehicles experience increased delay. Transit re-entry delay was calculated using empirical data presented in the 2000 Highway Capacity Manual (HCM). Total transit re-entry delay for each route was calculated as the sum of transit re-entry delay at each stop within the study area.
- **Passenger boarding delay**—Although increases in transit ridership are generally viewed positively, the amount of time a transit vehicle has to stop to pick up and drop off passengers (i.e., the transit vehicle dwell time) is directly correlated to the number of passengers boarding the vehicle. If, as proposed, the Project includes substantial improvements to transit service in the future (and as general transit ridership grows), vehicles would have to spend more time at stops, which may increase overall transit travel times. Passenger boarding delay was calculated assuming two seconds per

[121] The methodology used is similar to that used in the *San Francisco Bicycle Plan Draft EIR*, San Francisco Planning Department, November 2008, except that methodology included the additional transit delay associated with substantial increases in bicycle volumes, which was appropriate for a project contemplating large-scale changes to the City's bicycle network. Bicycle volumes are not expected to substantially change as part of this project, so the "bicycle delay" was not included. However, instead, this evaluation includes the added delay associated with increases in passenger boardings, which is more appropriate for this project since the project includes major improvements to area transit service.

passenger boarding for buses, and 0.5 seconds per passenger boarding for light rail vehicles. Passenger boardings within the study area were estimated by examining the increases in ridership across the study area cordons.

Although the transit routes in the study area would not be extended into the study area under existing conditions or under 2030 No Project conditions, transit delay for those scenarios was calculated as if the transit routes were extended only for purposes of comparing Project impacts. Generally, the increases in travel times associated with the Project are smaller than those associated with the increases expected between existing and 2030 No Project conditions. It should be noted that the determination of additional transit vehicles needed to maintain headways accounts for congestion on local streets, and does not include additional delay due to increased freeway congestion which would affect lines traveling on US-101 and I-280.

The Project was determined to have a significant impact if it would increase transit travel times such that additional transit vehicles would be required to maintain the proposed headways. This was assumed to be the case if either the Project's travel time increases to a particular route would be greater than ½ its proposed headway or if the number of required vehicles estimated using SFMTA's cost/scheduling model, which takes into account scheduled breaks and extra time built into schedules, increases by one or more vehicles with the addition of the Project characteristics.

The results of the analysis, in terms of additional buses needed to maintain headways, are summarized in Table III.D-9 (Additional Muni Transit Vehicle Requirements—2030 Conditions Weekday AM and PM Peak Periods). The transit vehicle requirements are presented for Project conditions (which reflects increases in transit travel times from 2030 No Project conditions) and for 2030 No Project conditions (which reflects increases in travel times between existing and 2030 No Project conditions). Additional information regarding the transit delay methodology and analysis results is included in the Transportation Study.

Table III.D-9 Additional Muni Transit Vehicle Requirements—2030 Conditions Weekday AM and PM Peak Periods

	Project Requirement		*2030 No Project Needs*	
Route	***AM***	***PM***	***AM***	***PM***
9-San Bruno	1	1	5	7
23-Monterey	0	0	1	1
24-Divisadero	2	2	1	0
28L-19th Avenue/Geneva Limited	1	1	1	1
29-Sunset	2	4	1	0
44-O'Shaughnessy	1	3	3	4
48-Quintara-24th Street	0	1	1	1
54-Felton 2	0	1	1	1
T-Third	0	1	2	1
Total	***7***	***14***	***16***	***16***

SOURCE: Fehr & Peers

7. Transit Capacity Utilization Analysis Methodology

The impact of additional transit ridership generated by the Project was assessed by comparing the projected ridership to the available transit capacity. Transit "Capacity Utilization" refers to transit riders as a percentage of the capacity of a transit line, or group of lines combined and analyzed as cordons or Screenlines across which the transit lines travel. The transit capacity utilization analysis was conducted for three conditions:

- At three cordons in the Project vicinity to identify the localized impacts of Project transit trips on Muni routes
- At the four standard Downtown Screenlines used to assess impacts on transit service between downtown and the rest of the City. The Downtown screenline analysis is conducted at the maximum load point (i.e., the point of greatest demand) for most transit lines traveling into and out of Downtown
- At the three standard Regional Screenlines to determine impacts on regional service providers

Muni

The number of AM and PM peak hour riders was obtained from Muni monitoring data for existing conditions, and adjusted for future year 2030 No Project conditions as described above using the SF-CHAMP travel demand model. The service capacity of each line was estimated by multiplying the passenger capacity of each transit vehicle by the number of actual trips that occurred when the ridership data was collected. The capacity includes seated passengers and an appreciable number of standing passengers per vehicle (the number of standing passengers is between 30 and 80 percent of the seated passengers depending upon the specific transit vehicle configuration). The maximum loads, including both seated and standing passengers, vary by vehicle type and are 45 passengers for a 30-foot bus, 63 passengers for a 40-foot bus, 94 passengers for a 60-foot bus, and 119 passengers for a light-rail vehicle. The percent utilization of capacity was then calculated by comparing the ridership demand to the capacity provided. Muni has established a capacity utilization standard of 85 percent.

The Muni capacity utilization analysis was conducted at three cordons at the perimeter of the study area. The three cordons and the Muni lines included in each analysis cordon are:

- North cordon at Cesar Chavez Street: T-Third, 9-San Bruno, 19-Polk lines
- West cordon located west of US-101: 23-Monterey, 24-Divisadero, 29-Sunset, 44-O'Shaughnessy, 26-Quintara-24th Street, 54-Felton
- East of Third Street: 19-Polk, 23-Monterey, 29-Sunset, 44-O'Shaughnessy, 54-Felton. The East of Third cordon was analyzed to assess the degree to which Project transit demand between the Project site and the T-Third Street light rail service would affect localized transit capacity

Downtown screenlines examine the overall utilization of Muni transit capacity into and out of downtown San Francisco from the Northeast, Northwest, Southeast, and Southwest of San Francisco. The downtown screenline analysis is included in the *SF Guidelines*, and has been recently updated to 2030 conditions as part of the analysis of the Planning Department's downtown Transit District Center project.

Regional Service Providers

Regional transit service was evaluated at the screenline level for the locations where different regional transit service enters San Francisco, including the North Bay (Golden Gate Transit and Ferries), East Bay (BART, AC Transit, Ferries), and South Bay (BART, Caltrain, SamTrans). All of the regional transit operators except BART have a one-hour load factor standard of 100 percent, which would indicate that all seats are full. BART has a peak period load factor standard of 115 percent, which indicates that all seats are full, and an additional 15 percent of the seating capacity are standees (i.e., 1.15 passengers per seat). The regional screenline analysis is included in the *SF Guidelines*, and has been recently updated to 2030 conditions as part of the analysis of the Planning Department's downtown Transit District Center project.

Additional information regarding the transit capacity utilization analysis, and illustration of the location of cordon and screenline locations, is included in the *Transportation Study*.

On-Site and Off-Site Construction Impacts

Impact TR-1: Construction Vehicle Traffic and Roadway Construction

Impact TR-1 **Construction of the Project would result in transportation impacts in the Project vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Project vicinity. (Significant and Unavoidable with Mitigation) *[Criterion D.n]***

- Buildout of the Project would occur over a 20-year period between 2011 and 2031. Initial construction activities would include demolition of existing structures, utility relocation and site clearance and grading at Hunters Point Shipyard to make the land available for the new stadium. The new stadium and the Yosemite Slough bridge are anticipated to be completed by 2017 in time for the 2017 football season.

Construction of the Project would occur in several phases. The duration of each phase would vary, depending on the type of development (e.g., residential, retail, office) and the amount of building space included in each phase. The majority of development would occur and be occupied by the end of the
- second phase, which has a scheduled completion date of 2023. The majority of the roadway network improvements would occur by 2019 (Phase I), and most transit improvements would be phased in by 2023 (within Phase I and Phase II). Construction impacts within the Project site would affect new residents, employees, and visitors to the area. Overall, throughout the construction period the addition of worker-related vehicles and transit trips would be less than those associated with Project conditions at full buildout.

During construction of the Project phases, building activities would generate traffic volumes from construction workers, truck deliveries of supplies and construction equipment, and the hauling of soils during Project grading and excavation. The peak phases of construction activities would occur between
- 2013 and 2018, when grading and infrastructure improvements would be ongoing at both Candlestick Point and Hunters Point Shipyard. During this phase, there would be between 130 and 460 construction workers that would be on-site on a daily basis, and between 70 and 540 construction truck trips that would travel to and from the site on a daily basis. These truck trip estimates assume that about 40 percent of the required import fill materials would be brought onto the site via barge, with the remaining arriving by truck.

Shoreline improvements at both Hunters Point Shipyard and Candlestick Point would peak in 2017, and would require an additional 45 to 50 construction workers on-site.

Construction related activities would generally occur Monday through Saturday, between 7:00 A.M. and 8:00 P.M., and the typical work shift for most construction workers would be from 7:00 A.M. to about 3:30 P.M. Construction is not anticipated to occur on Sundays or major legal holidays, but may occur on an as-needed basis. The hours of construction would be stipulated by the Department of Building Inspection, and the contractor would be required to comply with the San Francisco Noise Ordinance.[122] Delivery and removal of extra long or wide bridge construction components, equipment, or materials may occur outside theses hours on an as-needed basis.

Construction staging would mostly occur within the individual sites under construction or along existing street right-of-way. Construction staging would involve staging of construction vehicles, storage of construction materials, construction worker vehicles, delivery, and hauling trucks. Due to the large amount of vacant land in the Project site, construction staging would occur on-site, and construction-worker vehicles would likely park near construction sites in the Project site during most phases, and would not occupy spaces on neighborhood streets.

While the exact routes that construction trucks would be using would depend on the location of individual construction sites, it is expected that Harney Way, Hunters Point Expressway, Innes Avenue, Evans Avenue, Cesar Chavez Street, and Third Street would be the primary haul routes between US-101 and the various components of the Project.

In general, construction related transportation impacts would include impacts in the immediate vicinity of the development project under construction, on roadways within the Project site, and cumulative construction traffic impacts along the roadways in the Bayview Hunters Point neighborhood. Since the Project includes building construction as well as construction of a new street system and transit route extensions into the Project site, all Project construction operations would include plans for the closure of traffic/parking lanes and sidewalks adjacent to construction sites. The closure of sidewalks and parking lanes could last throughout the entire construction phase for each building or group of buildings. It is possible that more than one location within the Project site could be under construction at any one time and that multiple travel lane closures may be required.

During the construction period, temporary and intermittent disruption to existing and proposed transit routes and bus stops may occur, and some bus routes may need to be temporarily rerouted (for example, the 29-Sunset on Gilman Avenue and Giants Drive, the 54-Felton on Ingalls, the 23-Monterey and 44-O'Shaughnessey on Palou Avenue, and the 19-Polk on Innes Avenue. In addition, temporary and intermittent interference to transit operations caused by increased truck movements to and from the construction sites may occur. Any change in transit routes and stops would have to be coordinated and approved by the SFMTA.

Due to the reduction in travel lanes, the remaining travel lanes would become more congested with automobiles, trucks and buses, which would pose a greater challenge for bicycle travel in the area. Since bicycle traffic in the Project vicinity is relatively low, this impact is not anticipated to be significant. Existing

[122] The San Francisco Noise Ordinance permits construction activities seven days a week, between 7:00 A.M. and 8:00 P.M.

pedestrian volumes along the key access routes and at the proposed construction sites are low and, therefore, any sidewalk closures or rerouting of the walkway would not significantly affect pedestrian circulation. In general, temporary pedestrian walkways must be maintained in order to facilitate pedestrian movements.

The construction activities associated with the Project would overlap with construction activities of other development projects in the area, notably the HPS Phase I, Executive Park site, Brisbane Baylands, Visitacion Valley, India Basin Shoreline, and the Hunters View site. In addition, the Project construction activities would also overlap with nearby proposed transportation improvement projects, such as the US-101/Harney interchange improvements, and the Geneva Avenue Extension. These overlapping construction activities would increase the number of construction worker vehicles and trucks traveling to and from the project sites along Harney Way and Jamestown Avenue for the Executive Park project and for development within Candlestick Point, and on Cesar Chavez Street and Evans Avenue for the India Basin Shoreline, Hunters View project, and development within Hunters Point Shipyard. For example, construction activities of one or more projects that adversely affect roadway capacity (e.g., Harney Way widening), combined with construction vehicle traffic traveling to and from the roadway project and nearby development projects under construction (e.g., Executive Park and Candlestick Point), could result in increased delays due to traffic diversions and substantial increases in truck traffic.

Given the magnitude of development proposed for the area, the Project's prolonged construction period, and the lack of certainty about the timing of the projects in the area, significant Project-related and significant Project contributions to cumulative traffic and circulation impacts could occur on some roadways, such as US-101, Cesar Chavez Street, Evans Avenue, Harney Way, and Bayshore Boulevard. Cumulative impacts would include construction detours and increased travel times, although the extent and duration of delay would vary depending on individual driver's origin and destination, time of travel and use of alternate routes. Implementation of individual traffic control plans would minimize impacts associated with each project and reduce each project's contribution to cumulative impacts in overlapping areas. However, some disruption and increased delays could still occur even with implementation of traffic control plans, and it is possible that significant construction-related traffic impacts on local and regional roadways could still occur.

MM TR-1 *Candlestick Point–Hunters Point Shipyard Phase II Construction Traffic Management Program. The Project Applicant shall develop and implement a Candlestick Point–Hunters Point Shipyard Phase II Construction Traffic Management Program to minimize impacts of the Project and its contribution to cumulative impacts related to construction activities and construction traffic. The program shall provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. The program shall supplement and expand, rather than modify or supersede any manual, regulations, or provisions set forth by SFMTA, DPW or other City departments and agencies.*

Preparation of the Construction Management Program shall be the responsibility of the Project Applicant, and shall be reviewed and approved by SFMTA and DPW prior to initiation of construction. The Project Applicant shall update the program prior to approval of development plans for Phase 2, Phase 3, and Phase 4 of construction to reflect any change to Project development schedule, reflect transportation network changes, to update status of other development construction activities, and to reflect any changes to City requirements.

The program shall:

- *Identify construction traffic management practices in San Francisco, as well as other jurisdictions that although not being implemented in the City could provide useful guidance for a project of this size and characteristics.*
- *Describe procedures required by different departments and/or agencies in the City for implementation of a construction management plan, such as reviewing agencies, approval process, and estimated timelines.*
- *Describe coordination efforts associated with the Navy remediation efforts and scheduling regarding construction vehicle routing via the Crisp gate.*
- *Identify construction traffic management strategies and other elements for the Project, and present a cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the Bayview Hunters Point area. These could include construction strategies, demand management strategies, alternate route strategies, and public information strategies.*
- *Coordinate with other projects in construction in the immediate vicinity, so that they can take an integrated approach to construction-related traffic impacts.*
- *Present guidelines for selection of construction traffic management strategies.*

Implementation of mitigation measure MM TR-1 would help minimize the Project construction-related transportation impacts, and the Project's contribution to cumulative-construction related transportation impacts. However, some disruption and increased delays could still occur even with implementation of mitigation measure MM TR-1, and it is possible that significant construction-related transportation impacts on local and regional roadways could still occur. Localized construction-related transportation impacts would therefore remain significant and unavoidable.

Operational Impacts

Impact TR-2: Project and Cumulative Impacts to Traffic Volumes

Impact TR-2 **Implementation of the Project would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, even with implementation of a Travel Demand Management Plan. (Significant and Unavoidable with Mitigation) *[Criterion D.a]***

The travel demand analysis presented above and the number of vehicle trips assumed in the traffic impact analysis reflects implementation of the Project TDM Plan to encourage transit use and discourage use of single-occupant vehicles. The results of the traffic impact analysis presented in Impact TR-3 though Impact TR-13 below indicate that implementation of the Project would result in significant increases in traffic volumes, and at some locations impacts would be significant and unavoidable. The Project also would make a significant contribution to cumulative impacts at some locations. To minimize the potential for an increase in Project-generated vehicles and the Project's contribution to significant cumulative impacts, implementation of the Project TDM Plan would be required.

The final TDM Plan has not been formally approved yet[123] and mitigation measure MM TR-2 is required to ensure the final TDM Plan will be prepared and implemented. Thus, mitigation measure MM TR-2 below requires preparation, approval, and implementation of the final TDM Plan.

MM TR-2 *TDM Plan. The Project Applicant shall prepare and implement a final TDM plan, which shall include the following elements:*

- *Visitor Variable, Market-Rate Parking Pricing*
- *Maximum Permitted Parking Ratios*
- *Flexible Parking Management Strategies*
- *Unbundled Residential Parking*
- *Transit Strategies and Support Strategies*
- *Central Transit Hub*
- *Enhanced Transit Service and Bicycle Facilities*
- *Bicycle Support Facilities*
- *Wayfinding Signs*
- *EcoPass for Residents*
- *Carshare Services*
- *Employee TDM Programs*
  - > *Information Boards/Kiosks*
  - > *In-building Real-Time transit monitors with sightlines of transit hubs*
  - > *Commuter Benefits*
  - > *Employee EcoPass*
  - > *Carpool/Vanpools*
  - > *Guaranteed Ride Home Program*
  - > *Compressed Work Weeks, Flex Time, and Telecommuting*
- *CP-HPS Transportation Management Association*
- *On-site Transportation Coordinator and Website*
- *Targeted Marketing*
- *Monitoring of Transportation Demand*
- *Monitoring Effectiveness of Congestion-Reducing and Traffic-Calming Efforts*

The final TDM plan shall be approved as part of the Disposition and Development Agreement (DDA).

With implementation of the mitigation measure MM TR-2, alternative modes would be encouraged, the use of single-occupant vehicles would be discouraged, and the impact of additional vehicles generated by the Project would be lessened. However, as described in Impact discussions below, the Project would still result in significant and unavoidable impacts on traffic and transit operations, and would still make

[123] A draft TDM has been prepared and is described above in "Analytic Method" section in Section III.D.4.

considerable contributions to cumulative impacts related to substantial increases in traffic. Thus, the Project and Project's contribution to traffic would remain significant and unavoidable.

Impact TR-3: Project and Cumulative Intersection Traffic Impacts

Impact TR-3 **Implementation of the Project would contribute traffic to significant cumulative impacts at intersections in the Project vicinity. (Significant and Unavoidable) *[Criteria D.a, D.b, D.g]***

An intersection level of service analysis was prepared for traffic operations at 60 study intersections for future year 2030 conditions. Project impacts were assessed by comparing future year 2030 conditions with the Project, to 2030 No Project conditions. The "Analysis Approach" section in Section III.D.4, presents the methodology used to determine Project impacts and whether the Project would contribute substantially to significant cumulative impacts. The Project was determined to have a significant traffic impact at an intersection if Project-generated trips would cause an intersection operating at LOS D or better under 2030 No Project conditions to operate at LOS E or LOS F, or intersections operating at LOS E under 2030 No Project conditions to deteriorate to LOS F conditions. At intersections that would operate at LOS E or LOS F under 2030 No Project conditions, and would continue to operate at LOS E or LOS F under Project conditions, the increase in Project vehicle trips were reviewed to determine whether the increase would contribute considerably to critical movements operating at LOS E or LOS F.

Table III.D-10 (Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday AM Peak Hour) and Table III.D-11 (Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday PM Peak Hour) present a comparison of the intersection LOS analysis for existing, 2030 No Project and Project conditions for the weekday AM and PM peak hours, respectively. Table III.D-12 (Intersection LOS Existing, 2030 No Project and Project Conditions—Sunday PM Peak Hour) presents this comparison for the Sunday PM peak hour. The results show that of the 60 study intersections, 39 are projected to operate at unacceptable levels under Project conditions during at least one peak hour based. At 10 of the 39 intersections, the Project would result in Project-specific impacts and would contribute to significant cumulative impacts. At nine of the 10 intersections where Project-specific impacts would result, no feasible mitigation measures have been identified.

- Third/Oakdale
- Third/Revere
- Third/Carroll
- Third/Jamestown
- Bayshore/Paul
- Bayshore/Cortland
- Bayshore/US-101 Northbound Off-ramp/Cesar Chavez
- Third/Williams/Van Dyke
- Third/Jerrold

Table III.D-10 Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday AM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay* [a]	*LOS* [b]	*Delay*	*LOS*	*Delay*	*LOS*
1	Third St/25th St	14	B	>80/1.43	F	>80/1.54	F
2	Third St/Cesar Chavez St	36	D	>80/1.61	F	>80/1.63	F
3	Third St/Cargo Way	23	C	>80/1.36	F	>80/1.90	F
4	Third St/Evans Ave	35	C	>80/1.41	F	>80/1.43	F
5	Third St/Oakdale Ave	17	B	21	C	25	C
6	Third St/Palou Ave	15	B	>80/1.77	F	>80/1.91	F
7	Third St/Revere Ave	19	B	35	C	51	D
8	Third St/Carroll Ave	12	B	12	B	23	C
9	Third St/Paul Ave	27	C	>80/1.23	F	>80/2.00	F
10	Third St/Ingerson Ave	5	A	5	A	6	A
11	Third St/Jamestown Ave	13	B	29	C	>80/1.03	F
12	Third/Le Conte/US-101 nb off	11	B	50	D	50	D
13	25th St/Illinois St	7	A	14	B	13	B
14	25th St/Pennsylvania Ave	9	A	26	D	29	C
15	Cesar Chavez/Penns/I-280	78	E	>80/1.39	F	>80/1.39	F
16	Cesar Chavez St/Evans Ave	21	C	>80/1.92	F	>80/1.91	F
17	Cesar Chavez St/Illinois St	13	B	25	C	34	C
18	Bayshore Blvd/Paul Ave	21	C	61/1.56	E	>80/2.64	F
19	Bayshore/Hester/US-101 sb off	28	C	>80/1.34	F	>80/1.36	F
20	Bayshore Blvd/Tunnel Ave	19	B	>80/2.00	F	>80/2.05	F
21	Bayshore Blvd/Bacon St	76	E	>80/4.05	F	>80/4.08	F
22	Bayshore Blvd/Arleta St	25	C	>80/1.21	F	>80/1.23	F
23	Bayshore Blvd/Leland Ave	21	C	>80/1.24	F	>80/1.26	F
24	Bayshore Blvd/Visitacion Ave	17	B	>80/1.55	F	>80/1.56	F
25	Bayshore Blvd/Sunnydale Ave	20	C	>80/1.32	F	>80/1.34	F
26	Tunnel Ave/Blanken	11	B	43	D	>80/1.06	F

Table III.D-10 Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday AM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay* [a]	*LOS* [b]	*Delay*	*LOS*	*Delay*	*LOS*
27	Alana Way/Beatty Ave (US-101 SB Ramps)[c]	10	A	>80/2.17	F	>80/2.31	F
28	Alana Way/Harney Way/Mellon (US-101 NB Ramps)[c]	8	A	>80/1.20	F	>80/1.35	F
29	Harney Way/Jamestown Ave [d]	8	A	12	B	20	B
30	Crisp Ave/Palou Ave [d]	11.4 (nb)	B	57/0.99	E	44	D
31	Ingalls St/Thomas Ave[d]	11.3 (wb)	B	19.0 (wb)	C	22	C
32	Ingalls St/Carroll Ave [d]	8	A	15	B	28	C
33	Ingalls St/Egbert Ave	8	A	8	A	9	A
34	Arelious Walker/Gilman Ave [d]	9.1 (sb)	A	>60 (eb)	F	30	C
35	Amador St/Cargo Way	28	C	65/1.06	E	54	D
36	Bayshore Blvd/Cortland Ave	19	B	37	D	>80/1.18	F
37	Bayshore Blvd/Oakdale Ave	30	C	43	D	51	D
38	Bayshore/Alemany/Industrial	44	D	>80/1.00	F	>80/1.05	F
39	Bayshore/US-101 nb off to Cesar	43	D	74/0.91	E	>80/0.94	F
40	Bayshore Blvd/Silver Ave	50	D	>80/1.58	F	>80/1.70	F
41	Bayshore Blvd/Blanken Ave	12	B	>80/1.48	F	>80/1.51	F
42	San Bruno Ave/Paul Ave	20	B	>80/1.21	F	>80/1.23	F
43	San Bruno Ave/Silver Ave	75	E	>80/1.43	F	>80/1.41	F
44	San Bruno/Mansell/101 sb off	17	C	>80/1.08	F	>80/1.11	F
45	San Bruno/Silliman/101 sb off	24	C	>80/1.08	F	>80/1.08	F
46	Innes Ave/Arelious Walker Drive [d]	8.6 (sb)	A	5	A	6	A
47	Innes Ave/Earl St	8.5 (sb)	A	17.3 (sb)	C	13.3 (sb)	B
48	Evans Ave/Jennings St	9	A	>80/1.96	F	28	C
49	Bayshore Blvd/Geneva Ave	24	C	>80/1.39	F	>80/1.40	F
50	Bayshore/Guadalupe Pkwy	16	B	21	C	21	C
51	Bayshore Blvd/Valley Dr	23	C	20	C	20	C
52	Bayshore Blvd/Old County Rd	28	C	40	D	39	D

Table III.D-10 Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday AM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay* [a]	*LOS* [b]	*Delay*	*LOS*	*Delay*	*LOS*
53	Sierra Pt/Lagoon Way	12	B	>80/1.85	F	>80/1.85	F
54	Ingalls St/Palou Ave [d]	9	A	16	B	18	B
55	Keith St/Palou Ave [d]	9	A	10	A	9	A
56	Third/Williams/Van Dyke	22	C	18	B	30	C
57	Third St/Jerrold Ave	22	C	49	D	>80/0.74	F
58	Evans/Napoleon/Toland	37	D	>80/1.45	F	>80/1.50	F
59	Harney/Executive Park East	9.1 (sb)	A	25	C	25	C
60	Harney/Thomas Mellon	—	—	30	C	34	C

SOURCE: Fehr & Peers, 2009

a. Delay in seconds per vehicle. For Side Street STOP-controlled intersections, delay and LOS presented for worst approach. Worst approach indicated in ( ).
b. Intersections operating at LOS E or LOS F conditions highlighted in bold and overall intersection volume-to-capacity (v/c) ratio is presented.
c. Year 2030 analysis includes signalization as part of Executive Park Development or new Harney Interchange.
d. Year 2030 analysis includes signalization as part of Project.

Table III.D-11 Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday PM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay[a]*	*LOS[b]*	*Delay*	*LOS*	*Delay*	*LOS*
1	Third St/25th St	16	B	>80/2.45	F	>80/2.92	F
2	Third St/Cesar Chavez St	31	C	>80/1.56	F	>80/1.76	F
3	Third St/Cargo Way	20	B	>80/1.44	F	>80/1.74	F
4	Third St/Evans Ave	34	C	>80/1.36	F	>80/1.53	F
5	Third St/Oakdale Ave	19	B	30	C	60/1.12	E
6	Third St/Palou Ave	30	C	>80/4.71	F	>80/5.99	F
7	Third St/Revere Ave	31	C	37	D	>80/1.14	F
8	Third St/Carroll Ave	14	B	14	B	75/0.93	E
9	Third St/Paul Ave	24	C	>80/1.37	F	>80/3.36	F
10	Third St/Ingerson Ave	5	A	7	A	43	D
11	Third St/Jamestown Ave	14	B	30	C	>80/6.64	F
12	Third/Le Conte/US-101 nb off	11	B	24	C	23	C
13	25th St/Illinois St	7	A	14	B	14	B
14	25th St/Pennsylvania Ave	12	B	>80/1.42	F	40	D
15	Cesar Chavez/Penns/I-280	39	D	>80/1.36	F	>80/1.37	F
16	Cesar Chavez St/Evans Ave	21	C	>80/1.83	F	>80/1.84	F
17	Cesar Chavez St/Illinois St	19	B	22	C	23	C
18	Bayshore Blvd/Paul Ave	17	B	>80/2.00	F	>80/2.90	F
19	Bayshore/Hester/US-101 sb off	13	B	>80/1.25	F	>80/1.28	F
20	Bayshore Blvd/Tunnel Ave	16	B	>80/2.30	F	>80/2.51	F
21	Bayshore Blvd/Bacon St	22	C	>80/1.87	F	>80/1.91	F
22	Bayshore Blvd/Arleta St	25	C	>80/1.36	F	>80/1.39	F
23	Bayshore Blvd/Leland Ave	22	C	>80/1.58	F	>80/1.67	F
24	Bayshore Blvd/Visitacion Ave	15	B	>80/1.43	F	>80/1.47	F
25	Bayshore Blvd/Sunnydale Ave	19	B	>80/1.15	F	>80/1.19	F
26	Tunnel Ave/Blanken	9	A	>80/1.46	F	>80/1.45	F

Table III.D-11 Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday PM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay*[a]	*LOS*[b]	*Delay*	*LOS*	*Delay*	*LOS*
27	Alana Way/Beatty Ave (US-101 SB Ramps) [c]	9	A	>80/2.94	F	>80/3.25	F
28	Alana Way/Harney Way/Mellon (US-101 NB Ramps)[c]	8	A	>80/1.43	F	>80/1.74	F
29	Harney Way/Jamestown Ave[d]	8	A	40/1.03	E	41	D
30	Crisp Ave/Palou Ave[d]	11.6 (nb)	B	58/0.97	E	54	D
31	Ingalls St/Thomas Ave[d]	11.5 (wb)	B	27.9 (wb)	C	33	C
32	Ingalls St/Carroll Ave[d]	8	A	17	C	38	D
33	Ingalls St/Egbert Ave	8	A	9	A	9	A
34	Arelious Walker/Gilman Ave[d]	9.2 (sb)	A	>80 (eb)	F	36	D
35	Amador St/Cargo Way	24	C	60/1.05	E	59/1.04	E
36	Bayshore Blvd/Cortland Ave	25	C	>80/1.48	F	>80/1.87	F
37	Bayshore Blvd/Oakdale Ave	26	C	33	C	55	D
38	Bayshore/Alemany/Industrial	58/	E	>80/1.23	F	>80/1.18	F
39	Bayshore/US-101 nb off to Cesar	48	D	>80/0.88	F	>80/0.91	F
40	Bayshore Blvd/Silver Ave	50	D	>80/2.64	F	>80/2.91	F
41	Bayshore Blvd/Blanken Ave	11	B	>80/1.33	F	>80/1.40	F
42	San Bruno Ave/Paul Ave	20	B	>80/2.10	F	>80/2.71	F
43	San Bruno Ave/Silver Ave	46	D	>80/1.46	F	>80/1.56	F
44	San Bruno/Mansell/101 sb off	33	D	64/1.15	F	>80/1.22	F
45	San Bruno/Silliman/101 sb off	20	B	38	D	38	D
46	Innes Ave/Arelious Walker Drive[d]	8.7 (sb)	A	5	A	6	A
47	Innes Ave/Earl St	8.6 (sb)	A	23.1 (sb)	C	19.4 (sb)	C
48	Evans Ave/Jennings St	10	A	>80/2.41	F	31	C
49	Bayshore Blvd/Geneva Ave	25	C	>80/1.73	F	>80/1.76	F
50	Bayshore/Guadalupe Pkwy	14	B	50	D	49	D
51	Bayshore Blvd/Valley Dr	16	B	40	D	40	D
52	Bayshore Blvd/Old County Rd	29	C	>80/1.10	F	>80/1.13	F

Table III.D-11 Intersection LOS Existing, 2030 No Project and Project Conditions—Weekday PM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay*[a]	*LOS*[b]	*Delay*	*LOS*	*Delay*	*LOS*
53	Sierra Pt/Lagoon Way	16	C	>80/4.38	F	>80/4.38	F
54	Ingalls St/Palou Ave[d]	9	A	16	B	22	C
55	Keith St/Palou Ave[d]	9	A	8	A	8	A
56	Third/Williams/Van Dyke	22	C	17	B	>80/0.98	F
57	Third St/Jerrold Ave	23	C	>80/0.72	F	>80/0.88	F
58	Evans/Napoleon/Toland	46	D	>80/1.53	F	>80/1.61	F
59	Harney/Executive Park East	8.9 (sb)	A	25	C	26	C
60	Harney/Thomas Mellon	—	—	19	B	26	C

SOURCE: Fehr & Peers, 2009.

a. Delay in seconds per vehicle. For Side Street STOP-controlled intersections, delay and LOS presented for worst approach. Worst approach indicated in ( ).

b. Intersections operating at LOS E or LOS F conditions highlighted in bold and overall intersection volume-to-capacity (v/c) ratio is presented.

c. Year 2030 analysis includes signalization as part of Executive Park Development or new Harney Interchange.

d. Year 2030 analysis includes signalization as part of Project.

Table III.D-12 Intersection LOS Existing, 2030 No Project and Project Conditions—Sunday PM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay[a]*	*LOS[b]*	*Delay*	*LOS*	*Delay*	*LOS*
1	Third St/25th St	13	B	63/0.57	E	58/0.70	E
2	Third St/Cesar Chavez St	23	C	31	C	66/0.73	E
3	Third St/Cargo Way	17	B	30	C	30	C
4	Third St/Evans Ave	32	C	57/0.65	E	59/0.87	E
5	Third St/Oakdale Ave	15	B	14	C	15	B
6	Third St/Palou Ave	29	C	>80/0.92	F	>80/4.03	F
7	Third St/Revere Ave	22	C	20	B	24	C
8	Third St/Carroll Ave	9	A	10	B	55/0.66	E
9	Third St/Paul Ave	21	C	64/0.73	E	>80/1.89	F
10	Third St/Ingerson Ave	3	A	3	A	27	C
11	Third St/Jamestown Ave	21	C	24	C	>80/1.24	F
12	Third/Le Conte/US-101 nb off	12	B	14	B	13	B
13	25th St/Illinois St	7	A	10	A	10	A
14	25th St/Pennsylvania Ave	10	A	45/1.01	E	34	C
15	Cesar Chavez/Penns/I-280	28	C	61/0.65	E	60/0.65	E
16	Cesar Chavez St/Evans Ave	15	B	18	B	19	B
17	Cesar Chavez St/Illinois St	14	B	18	B	18	B
18	Bayshore Blvd/Paul Ave	12	B	14	B	54	D
19	Bayshore/Hester/US-101 sb off	14	B	14	B	14	B
20	Bayshore Blvd/Tunnel Ave	8	A	53	D	60/1.59	E
21	Bayshore Blvd/Bacon St	13	B	17	B	31	C
22	Bayshore Blvd/Arleta St	12	B	56	D	49	D
23	Bayshore Blvd/Leland Ave	24	C	41	D	38	D
24	Bayshore Blvd/Visitacion Ave	18	B	64/0.98	E	70/1.03	E
25	Bayshore Blvd/Sunnydale Ave	15	B	55	D	55	D
26	Tunnel Ave/Blanken	19	B	30	C	51	D

Table III.D-12 Intersection LOS Existing, 2030 No Project and Project Conditions—Sunday PM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay[a]*	*LOS[b]*	*Delay*	*LOS*	*Delay*	*LOS*
27	Alana/Beatty (US-101 SB Ramps)[c]	8	A	>80/2,04	F	>80/2.34	F
28	Alana/Harney/Mellon (101 NB)[c]	8	A	54	D	>80/1.36	F
29	Harney Way/Jamestown Ave[d]	9	A	22	C	24	C
30	Crisp Ave/Palou Ave[d]	7	A	37	D	46	D
31	Ingalls St/Thomas Ave[d]	11.1 (sb)	B	11.8 (wb)	B	26	C
32	Ingalls St/Carroll Ave[d]	9.9 (wb)	A	9	A	28	C
33	Ingalls St/Egbert Ave	7	A	8	A	8	A
34	Arelious Walker/Gilman Ave[d]	7	A	72.5 (eb)	F	36	D
35	Amador St/Cargo Way	8.9 (sb)	A	21	F	20	B
36	Bayshore Blvd/Cortland Ave	28	C	23	C	25	C
37	Bayshore Blvd/Oakdale Ave	17	B	21	C	21	C
38	Bayshore/Alemany/Industrial	24	C	40	C	52	D
39	Bayshore/US-101 nb off to Cesar	35	D	25	D	26	C
40	Bayshore Blvd/Silver Ave	25	C	19	C	26	C
41	Bayshore Blvd/Blanken Ave	9	A	51	D	68/1.16	E
42	San Bruno Ave/Paul Ave	16	B	39	D	>80/1.46	F
43	San Bruno Ave/Silver Ave	41	D	>80/1.29	F	>80/1.40	F
44	San Bruno/Mansell/101 sb off	16	C	27	D	38/1.00	E
45	San Bruno/Silliman/101 sb off	17	B	78/0.36	E	70/0.37	E
46	Innes Ave/Arelious Walker Drive [d]	8.5 (sb)	A	4	A	6	A
47	Innes Ave/Earl St	8.5 (sb)	A	9.9 (sb)	A	10 (sb)	B
48	Evans Ave/Jennings St	8	A	33	D	20	C
49	Bayshore Blvd/Geneva Ave	20	C	44	D	43	D
50	Bayshore/Guadalupe Pkwy	10	B	9	A	9	A
51	Bayshore Blvd/Valley Dr	11	B	10	A	10	A
52	Bayshore Blvd/Old County Rd	26	C	43	D	42	D

Table III.D-12 Intersection LOS Existing, 2030 No Project and Project Conditions—Sunday PM Peak Hour

		Existing		*2030 No Project*		*2030 Project*	
	Intersection	*Delay[a]*	*LOS[b]*	*Delay*	*LOS*	*Delay*	*LOS*
53	Sierra Pt/Lagoon Way	8	A	43	D	44/1.01	E
54	Ingalls St/Palou Ave[d]	8	A	16	B	22	C
55	Keith St/Palou Ave[d]	8	A	10	B	7	A
56	Third/Williams/Van Dyke	22	C	14	B	23	C
57	Third St/Jerrold Ave	21	C	23	C	31	C
58	Evans/Napoleon/Toland	32	C	57/0.50	E	60/0.57	E
59	Harney/Executive Park East	8.8 (eb)	A	18	B	22	C
60	Harney/Thomas Mellon	—	—	15	B	19	B

SOURCE: Fehr & Peers, 2009

a. Delay in seconds per vehicle. For Side Street STOP-controlled intersections, delay and LOS presented for worst approach. Worst approach indicated in ( ).
b. Intersections operating at LOS E or LOS F conditions highlighted in bold and overall intersection volume-to-capacity (v/c) ratio is presented.
c. Year 2030 analysis includes signalization as part of Executive Park Development or new Harney Interchange.
d. Year 2030 analysis includes signalization as part of Project.

The degradation in level of service would primarily be due to Project-related traffic increases along Third Street and Bayshore Boulevard, and major east/west streets serving Project traffic (e.g., Carroll Avenue, Gilman Avenue, Jamestown Avenue). Improvements along Third Street are limited due to right-of-way constraints associated with the Third Street light rail, and traffic signals on intersections along Third Street are timed to prioritize transit movements along Third Street. The SFMTA has indicated that there may be slight adjustments to the traffic signal timing for intersections along Third Street that could be implemented that would reduce auto delay at signalized intersections without degrading transit travel times. However, those improvements would not be sufficient to improve intersection operating conditions to acceptable levels.

To accommodate additional right-of-way needed for additional lanes, Third Street would need to be widened to the east and the west. This would require demolition of existing structures and substantial right-of-way acquisition, or reduction in corner sidewalk width and prohibition of on-street parking along Third Street. Widening Third Street or reducing the corner sidewalk space at this location would be inconsistent with the pedestrian environment created by the Third Street Light Rail Project, as it would make the pedestrian crossing of Third Street longer, and would require more dedicated pedestrian crossing time as part of the signal phasing plan. Due to the issues related to acquisition of additional right-of-way, the measure was determined to be infeasible.

At the intersection of Bayshore/Paul, the degradation in level of service would primarily be due to forecasted traffic volume increases on Paul Avenue. Paul Avenue is one of a relatively few number of streets in the area that connects between the east and west side of US-101. As a result, east/west travel in the area is concentrated to the few streets that provide connections across the freeway, including Paul Avenue. Widening Paul Avenue at this intersection would create the need for major right-of-way acquisition and likely require reconstruction of the US-101 overpass to accommodate a wider Paul Avenue cross section, which would be infeasible. Sufficient right-of-way is also not available on Bayshore Boulevard to provide additional capacity. Widening of Bayshore Boulevard at Paul Avenue, Cortland Avenue or at the US-101 northbound off-ramp would also not be feasible, as roadway widening would require major right-of-way acquisition along the entire Bayshore Boulevard corridor, at great cost and displacement of existing homes and businesses.

The Project's traffic impacts and the Project's contribution to cumulative impacts at these nine study intersections therefore would be significant and unavoidable.

Impact TR-4: Project and Cumulative Intersection Traffic Impacts

Impact TR-4 **At the intersection of Tunnel/Blanken, implementation of the Project would result in significant Project AM peak hour traffic impacts, and would contribute to cumulative PM peak hour traffic impacts. (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

At the signalized intersection of Tunnel/Blanken (currently unsignalized and required to be signalized as part of the Visitacion Valley Mitigation Program), the intersection operating conditions would worsen in the AM peak hour from LOS D under 2030 No Project conditions to LOS F with the Project, resulting in a significant impact. In the PM peak hour, the intersection would operate at LOS F under 2030 No Project

and with the Project conditions. Based on an assessment of the critical movements at the intersection and Project contributions, the Project would contribute to cumulative PM peak hour traffic impacts.

MM TR-4 *Restripe the northbound and southbound approaches of the intersection of Tunnel/Blanken to provide dedicated left-turn lanes adjacent to shared through/right-turn lanes. The restriping would require prohibition of parking for 160 feet in the southbound approach (loss of eight parking spaces) and for 100 feet in the northbound approach (loss of five parking spaces).*

Implementation of the intersection restriping shall be the responsibility of SFMTA, and shall be implemented when intersection improvements associated with the Visitacion Valley Redevelopment Plan (i.e., signalization) are no longer sufficient to maintain acceptable intersection level of service conditions.

With implementation of mitigation measure MM TR-4, operations at this intersection would improve, but not to acceptable LOS D or better conditions during the AM and PM peak hours. Therefore, Project-related impacts at this intersection would remain significant and unavoidable.

Impact TR-5: Contributions to Cumulative Intersection Traffic Impacts

Impact TR-5 **Implementation of the Project would contribute traffic at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions. (Significant and Unavoidable) *[Criteria D.a, D.b, D.g]***

At intersections that would operate at LOS E or LOS F under 2030 No Project conditions, and would continue to operate at LOS E or LOS F under Project conditions, the increase in vehicle trips from 2030 No Project were reviewed to determine whether the increase would contribute considerably to critical movements operating at LOS E or LOS F. The Project contributions were examined at 29 study intersections that would operate at LOS E or LOS F under 2030 No Project conditions, and Project contributions were determined to be significant at 20 intersections. No feasible mitigation measures were identified at 16 of the 20 intersections:

- Third Street/25th Street
- Third Street/Cesar Chavez Street
- Third Street/Cargo Way
- Third Street/Evans Avenue
- Third Street/Palou Avenue
- Third Street/Paul Avenue
- Bayshore Boulevard/Visitacion Avenue
- Bayshore Boulevard/Alemany Boulevard/Industrial Street
- Bayshore Boulevard/Blanken
- San Bruno Avenue/Paul Avenue
- San Bruno Avenue/Silver Avenue
- San Bruno Avenue/Mansell Avenue/US-101 Southbound Off-ramp
- Cesar Chavez Street/Pennsylvania/I-280
- Bayshore Boulevard/Bacon Street
- Bayshore Boulevard/Sunnydale Avenue
- Evans Avenue/Napoleon Avenue/Toland Street

The poor operating conditions would be due to forecasted traffic volume increases in the study area, and particularly along the north/south routes on Third Street, Bayshore Boulevard, and San Bruno Avenue. Improvements at these intersections are limited due to right-of-way constraints. Since no feasible mitigation measures were identified for the 16 study intersections, the Project-related contributions to cumulative traffic impacts at these locations would be significant and unavoidable.

Impact TR-6: Contributions to Cumulative Impacts at Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps

Impact TR-6 **Implementation of the Project could contribute traffic at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions. (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

As noted in Impact TR-5, the Project contributions to cumulative impacts were examined at 29 study intersections that would operate at LOS E or LOS F under 2030 No Project conditions. Project contributions were determined to be significant at 20 intersections. No feasible traffic mitigation measures were identified at 16 of the 20 intersections (Impact TR-5), while a mitigation measure was identified for the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps addressed in Impact TR-6, Amador/Cargo/Illinois addressed in Impact TR-7, and Bayshore/Geneva addressed in Impact TR-8.

MM TR-6 *Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts. The City of Brisbane and Caltrans, as part of the Harney Interchange Project, shall account for existing traffic, background traffic growth, and the most recent forecasts of traffic expected to be associated with each of several adjacent development projects, including the Project. The San Francisco County Transportation Authority (SFCTA) shall coordinate with the City of Brisbane and Caltrans to ensure Project-generated vehicle trips are accounted for in the Harney Interchange analyses and design.*

Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts, including freeway segment impacts, shall be formulated through the current interjurisdictional Bi-County Transportation Study effort being led by the SFCTA or its equivalent. The Project Applicant shall contribute its fair share to the Harney Interchange Project.

Because the environmental review of the interchange project is not yet complete and the interchange would be approved by Caltrans, the implementation of mitigation measure MM TR-6 is uncertain and is outside of the City/Agency jurisdiction. Therefore, Project-related contributions to cumulative traffic impacts at these two intersections would remain significant and unavoidable.

Impact TR-7: Contributions to Cumulative Impacts at Amador/Cargo/Illinois

Impact TR-7 **Implementation of the Project could contribute traffic to the intersections of Amador/Cargo/Illinois, which would operate at LOS E under 2030 No Project. (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

As noted in Impact TR-5, the Project contributions to cumulative impacts were examined at 29 study intersections that would operate at LOS E or LOS F under 2030 No Project conditions. Project contributions were determined to be significant at 20 intersections. No feasible traffic mitigation measures

were identified at 16 of the 20 intersections (Impact TR-5), while mitigation measures were identified for the four intersections discussed in Impact TR-6, Impact TR-7, and Impact TR-8.

MM TR-7 *Feasibility study of reconfiguring the southbound approach on Illinois Street to provide a dedicated southbound left turn lane and a dedicated right-turn lane. SFMTA shall conduct a feasibility study with the Port of San Francisco to determine the feasibility of reconfiguring the southbound approach on Illinois Street to provide a dedicated southbound left turn lane and a dedicated right-turn lane. Sufficient right-of-way is available to implement this improvement; however, provision of two southbound lanes would require narrowing a portion of the island to the west of the southbound approach to Cargo Way. Implementation of the intersection improvements shall be the responsibility of SFMTA and the Port of San Francisco, and shall be implemented when traffic operating conditions with the existing intersection configuration worsens to unacceptable levels. If determined feasible, the Project Applicant shall contribute its fair share to the intersection improvements.*

With implementation of MM TR-7, operations at this intersection would improve to acceptable LOS C conditions during the AM and PM peak hours. However, since a feasibility study would be required, implementation of MM TR-7 is uncertain, and therefore, Project-related impacts at this intersection would remain significant and unavoidable.

Impact TR-8: Contributions to Cumulative Impacts at Bayshore/Geneva

Impact TR-8 **Implementation of the Project could contribute traffic to the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project. (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

As noted in Impact TR-5, the Project contributions to cumulative impacts were examined at 29 study intersections that would operate at LOS E or LOS F under 2030 No Project conditions. Project contributions were determined to be significant at 14 intersections. No feasible traffic mitigation measures were identified at 16 of the 20 intersections (Impact TR-5), while mitigation measures were identified for the four intersections discussed in Impact TR-6, Impact TR-7, and Impact TR-8.

MM TR-8 *Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts. The City of Brisbane, as part of the Geneva Avenue Extension Project, shall account for existing traffic, background traffic growth, and the most recent forecasts of traffic expected to be associated with each of several adjacent development projects, including the Project. The San Francisco County Transportation Authority (SFCTA) and SFMTA shall coordinate with the City of Brisbane to ensure projected traffic volumes are accounted for in the design of the Geneva Avenue Extension.*

Mitigations and associated fair-share funding measures for cumulative regional roadway system impacts, including freeway segment impacts, shall be formulated through the current interjurisdictional Bi-County Transportation Study effort being led by the SFCTA or its equivalent. The Project Applicant shall contribute its fair share to the Geneva Avenue Extension Project.

Since implementation of mitigation measure MM TR-8 would be under the jurisdiction of the City of Brisbane, the implementation of the mitigation measure is uncertain. Therefore, the Project-related impacts at this intersection would remain significant and unavoidable.

Impact TR-9: Project and Cumulative Intersection Traffic Impacts

Impact TR-9 **Implementation of the Project would have less-than-significant Project and cumulative impacts at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions. (Less than Significant)** ***[Criteria D.a, D.b, D.g]***

As described in Impact TR-5 and Impact TR-6, at 20 of 29 intersections that would operate at LOS E or LOS F under 2030 No Project conditions, and would continue to operate at LOS E or LOS F under Project conditions, the increase in vehicle trips from 2030 No Project caused by the Project was determined to be significant. Project contributions at the following 9 of the 29 study intersections were determined to be less than significant:

- Cesar Chavez/Evans Avenue
- Bayshore/Hester/US-101 Southbound off-ramp
- Bayshore Boulevard/Tunnel Avenue
- Bayshore Boulevard/Arleta Street
- Bayshore Boulevard/Leland Avenue
- Bayshore Boulevard/Silver Avenue
- San Bruno/Silliman Street/US-101 Southbound Off-ramp
- Bayshore Boulevard/Old County Road
- Sierra Point/Lagoon Way

The poor operating conditions at these study area intersections would be due to traffic volume increases associated with other developments in the Project vicinity. Since the Project would not contribute significantly to the poor operating conditions, Project-related impacts at these locations would be less than significant.

Impact TR-10: Project and Cumulative Traffic Spillover

Impact TR-10 **Implementation of the Project would result in significant Project traffic spillover impacts and contribute to cumulative traffic spillover impacts. (Significant and Unavoidable with Mitigation)** ***[Criterion D.a]***

As described in Impact TR-3 through Impact TR-9, the Project would result in traffic volumes on area roadways, and most substantially on key north/south and east/west streets, which would also experience cumulative traffic growth. A concern in the Bayview Hunters Point neighborhood is the likelihood that existing residential streets would be "cut-throughs," shortcuts, or bypasses used by non-neighborhood traffic. Substantial amounts of cut-through traffic can result in impacts such as noise, safety impacts to pedestrians, impaired driveway access, interference with emergency vehicle access, increased dust, exhaust, and litter, and similar annoyances that adversely affect neighborhood character.

Within the Candlestick Point area, the Project would include new arterials connecting the Project site to Harney Way and US-101, as well as improvements to existing roadways such as Carroll Avenue, Gilman Avenue, and Jamestown Avenue. These improvements and new roadways would encourage residents and visitors to the Project to use the major arterials for access to and from the site, and would minimize the likelihood of cut-through traffic using residential streets in Bayview Hunters Point. Many of the residential

streets in the neighborhood do not cross Third Street to connect with Bayshore Boulevard, and therefore are not attractive bypass routes. In addition, left turns from Third Street are permitted at limited locations, with Carroll Avenue, Gilman Avenue and Jamestown Avenue anticipated to serve as the key east/west routes for Project traffic.

SFMTA has recently completed the *Bayview Traffic Calming Project*[124] which was a community-based process to identify problem locations with a study area roughly bounded by Jamestown Avenue, Third Street and Evans Avenue, and traffic calming measures. The study resulted in a list of traffic calming measures (such as gateway islands, speed humps, speed cushions, and traffic circles) along specific roadways. Implementation of improvements will be phased, and most cost-efficient solutions will be implemented first. Implementation of SFMTA's traffic calming recommendations for the Bayview (e.g., gateway islands, speed humps, speed cushions, and traffic circles) would discourage cut-through traffic.

In addition, the TDM Plan included as part of MM TR-2 would require annual monitoring of traffic conditions to review the effectiveness of the Project's transportation measures and other traffic calming measures implemented in the area to reduce congestion due to Project vehicle trips and to minimize traffic spillover to neighboring residential streets. If warranted, the On-site TDM Coordinator and SFMTA would consider implementation of additional traffic-calming and congestion-alleviating measures, such as adding additional lanes to the streets that approach Third Street, or other congested areas. However, given that many intersections at or near the Project site would be congested, it is likely that spillover impacts would still occur.

Implementation of mitigation measures MM TR-2 and MM TR-17 would likely reduce spillover impacts. Nonetheless, cut-through traffic may occur during periods of congestion, and the impacts associated with spillover traffic would remain significant and unavoidable.

Impact TR-11: Contributions to Cumulative Freeway Mainline and Weaving Segments Impacts

Impact TR-11 **Implementation of the Project would contribute to significant cumulative traffic impacts at four freeway segments. (Significant and Unavoidable)** ***[Criteria D.a, D.b, D.g]***

Freeway mainline level of service analysis was prepared for six locations on US-101 and four locations on I-280. For freeway mainline and ramp analyses, locations where the Project would result in a change from LOS D or better under 2030 No Project conditions to LOS E or LOS F, or from LOS E or LOS F, with the Project are identified as Project impacts. At locations that would operate at LOS E or LOS F under 2030 No Project conditions, and would continue to operate at LOS E or LOS F under Project conditions, the Project trips, as a percentage of total traffic volumes on the facility were reviewed to determine whether the increase would contribute considerably to total volumes on the facility.

Table III.D-13 (Mainline and Weaving Segment LOS Existing, 2030 No Project and 2030 Project Conditions) presents the results of the freeway mainline and weaving section analysis for existing, 2030 No Project and Project conditions. The Project would not cause any freeway mainline segment to deteriorate from acceptable LOS D or better to LOS E or F conditions, nor would it cause any segment to deteriorate

[124] *Bayview Traffic Calming Project* report, SFMTA, December 2006.

from LOS E to LOS F. However, the Project would contribute cumulatively considerable amounts of traffic to four freeway segments expected to operate at LOS E or LOS F under 2030 No Project conditions:

- US-101 northbound from Sierra Point to Alana/Geneva/Harney
- US-101 southbound from the I-80 Merge to Cesar Chavez
- US-101 southbound from Third/Bayshore to Alana/Geneva/Harney
- US-101 southbound from Alana/Geneva/Harney to Sierra Point

The Project's contributions to LOS E or LOS F conditions at the four freeway segments would be considered significant impacts. The projected poor operating conditions on the affected freeway segments could only be improved by creating additional mainline capacity, which would require substantial additional right-of-way acquisition, substantial freeway reconstruction, and associated substantial costs, and would require an associated interjurisdictional transportation improvement planning, prioritization and fair share funding formulation effort, that exceed the reasonable scope of the Project and reasonable control of the lead agency. More specifically:

- Freeway mainline widening to provide acceptable operational conditions would require acquisition of substantial right-of-way, and substantial and infeasible reconstruction of the affected freeway segments and associated over- and under-crossings, the cost of which far exceed the reasonable capability and responsibility of the Project, and for which no interjurisdictional fair share funding mechanism has been established
- The co-lead agencies (Planning Department and the Redevelopment Agency) do not have jurisdiction over the affected freeway right-of-way; the necessary right-of-way acquisition would necessarily involve Caltrans use of its eminent domain powers
- Expansion of portions of the affected freeway segments rights-of-way is constrained by existing topography
- Acquisition of portions of the necessary additional freeway mainline and associated under- and over-crossing right-of-way, and subsequent construction of the necessary freeway mainline widening and associated under- and over-crossings, could not be achieved without the displacement of existing businesses and households and demolition of existing residential and commercial establishments

Therefore, mitigation of this Project-related contribution to 2030 cumulative freeway congestion impacts to a less-than-significant level is considered to be infeasible. The Project-related contribution to this cumulative freeway segment congestion would be significant and unavoidable.

Table III.D-13 Mainline and Weaving Segment LOS Existing, 2030 No Project and 2030 Project Conditions

	Existing		*2030 No Project*		*2030 Project*	
WEEKDAY AM PEAK HOUR						
Mainline Segment	***LOS***	***Density[a] (pc/mi/ln)***	***LOS***	***Density (pc/mi/ln)***	***LOS***	***Density (pc/mi/ln)***
US-101						
NB—Cesar Chavez to Vermont	E	44.6	F	>45	F	>45
NB—Harney Way to Third/Bayshore	D	33.8	F	>45	F	>45
NB—Sierra Point to Harney Way	D	33.8	E	40.5	E	44.0
SB—I-80 Merge to Cesar Chavez	D	33.4	F	>45	F	>45
SB—Third/Bayshore to Harney Way	E	43.0	F	>45	F	>45
SB—Harney/Geneva to Sierra Point	E	42.2	F	>45	F	>45
I-280						
NB—Alemany Off to Alemany On	E	39.1	>45	F	>45	F
SB—Alemany On to Alemany Off	C	23.9	D	34.6	D	34.6
Weaving Segment	***LOS***	***Service Vol. (pc/l)***	***LOS***	***Service Vol. (pc/l)***	***LOS***	***Service Vol. (pc/l)***
I-280						
NB—25th Street to Mariposa Street	E	1,680	F	>1,900	F	>1,900
SB—Mariposa Street to 25th Street	B	810	E	1,710	E	1,710
WEEKDAY PM PEAK HOUR						
Mainline Segment	***LOS***	***Density[a] (pc/mi/ln)***	***LOS***	***Density (pc/mi/ln)***	***LOS***	***Density (pc/mi/ln)***
US-101						
NB—Cesar Chavez to Vermont	D	26.8	F	>45	F	>45
NB—Harney Way to Third/Bayshore	E	42.3	F	>45	F	>45
NB—Sierra Point to Harney Way	E	42.9	F	>45	F	>45
SB—I-80 Merge to Cesar Chavez	D	33.8	F	>45	F	>45
SB—Third/Bayshore to Harney Way	E	36.0	F	>45	F	>45
SB—Harney/Geneva to Sierra Point	E	36.8	F	>45	F	>45
I-280						
NB—Alemany Off to Alemany On	C	23.9	D	33.3	D	33.3

Table III.D-13 Mainline and Weaving Segment LOS Existing, 2030 No Project and 2030 Project Conditions

	Existing		*2030 No Project*		*2030 Project*	
SB—Alemany On to Alemany Off	F	>45	F	>45	F	>45
Weaving Segment	***LOS***	***Service 3 Vol. (pc/l)***	***LOS***	***Service Vol. (pc/l)***	***LOS***	***Service Vol. (pc/l)***
I-280						
NB—25th Street to Mariposa Street	C	1,350	F	>1,900	F	>1,900
SB—Mariposa Street to 25th Street	E	1,630	F	>1,900	F	>1,900
SUNDAY PM PEAK HOUR						
Mainline Segment	***LOS***	***Density[a] (pc/mi/ln)***	***LOS***	***Density (pc/mi/ln)***	***LOS***	***Density (pc/mi/ln)***
US-101						
NB—Cesar Chavez to Vermont	C	20.6	D	32.3	D	33.7
NB—Harney Way to Third/Bayshore	C	22.0	D	30.4	D	32.3
NB—Sierra Point to Harney Way	C	21.9	D	27.3	D	31.4
SB—I-80 Merge to Cesar Chavez	D	28.8	D	33.3	D	34.1
SB—Third/Bayshore to Harney Way	C	21.4	D	32.0	D	34.3
SB—Harney/Geneva to Sierra Point	C	21.2	C	24.9	D	28.6
I-280						
NB—Alemany Off to Alemany On	B	15.6	C	21.6	C	21.6
SB—Alemany On to Alemany Off	D	27.0	D	29.5	D	29.5
Weaving Segment	***LOS***	***Service 3, 4 Vol. (pc/l)***	***LOS***	***Service Vol. (pc/l)***	***LOS***	***Service Vol. (pc/l)***
I-280						
NB—25th Street to Mariposa Street	A	—	C	1,200	C	1,220
SB—Mariposa Street to 25th Street	A	—	C	1,310	C	1,300

SOURCE: Fehr and Peers, 2009

a. Segments operating at LOS E or LOS F conditions highlighted in bold
b. Density of vehicles per segment. pc/mi/ln = passenger cars per mile per lane.
c. For weaving sections service volume is reported as the measure of effectiveness. pc/h = passenger cars per hour
d. Weaving segments with speeds greater than 50 mph are outside of the realm of the weaving analysis, and thus are assumed to operate at LOS A.

Impact TR-12: Freeway Ramp Impacts

Impact TR-12 **Implementation of the Project would result in significant impacts at four freeway on-ramp locations. (Significant and Unavoidable) *[Criteria D.a, D.b, D.g]***

Table III.D-14 (Ramp Junction LOS Existing, 2030 No Project and 2030 Project Conditions) presents the results of the freeway ramps analysis for existing, 2030 No Project and Project conditions. The Project would cause four ramp junctions to deteriorate from acceptable LOS D or better to LOS E or F conditions or from LOS E to LOS F conditions:

- US-101 northbound on-ramp from Alemany Boulevard
- US-101 northbound on-ramp from Harney Way
- US-101 northbound on-ramp from Bayshore Boulevard/Cesar Chavez Street
- US-101 southbound on-ramp from Harney Way/Geneva Avenue

The Project would result in significant traffic impacts at these locations. Providing additional on-ramp lanes would simply increase the volume of traffic entering the freeway mainline segment, and may exacerbate the poor merging conditions. As noted in Impact TR-11, widening of US-101 to provide additional capacity would not be feasible. Thus, mitigation of these impacts has been determined to be infeasible. Project impacts at these locations would be significant and unavoidable.

Impact TR-13: Contributions to Cumulative Freeway Ramp Impacts

Impact TR-13 **Implementation of the Project would contribute to significant cumulative traffic impacts at 12 freeway ramp locations. (Significant and Unavoidable) *[Criteria D.a, D.b, D.g]***

The Project would also contribute cumulatively significant traffic increases at ramp junctions projected to operate at LOS E or LOS F under 2030 No Project conditions:

- US-101 northbound on-ramp from Sierra Point Parkway
- US-101 northbound on-ramp from Harney Way
- US-101 northbound on-ramp from Alemany Boulevard
- US-101 northbound on-ramp from Bayshore Boulevard/Cesar Chavez Street
- US-101 southbound off-ramp to Bayshore Boulevard/Cesar Chavez Street
- US-101 southbound on-ramp from Third Street/Bayshore Boulevard
- US-101 southbound on-ramp from Harney Way/Geneva Avenue
- US-101 southbound on-ramp from Sierra Point Parkway
- I-280 northbound off-ramp to Cesar Chavez Street
- I-280 northbound on-ramp from Indiana Street/25th Street
- I-280 southbound off-ramp to Pennsylvania Avenue/25th Street
- I-280 southbound on-ramp from Pennsylvania Avenue/25th Street

The Project would contribute to significantly cumulative traffic impacts at these locations. As described above in Impact TR-11, no feasible mitigation measures have been identified for the ramp junction locations. Therefore, the Project's contribution to cumulative impacts at the ramp locations would be significant and unavoidable.

Table III.D-14 Ramp Junction LOS Existing, 2030 No Project and 2030 Project Conditions

Ramp Location	Existing		2030 No Project		2030 Project	
	LOS	Density[a] (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
WEEKDAY AM PEAK HOUR						
US-101						
NB on from Sierra Point Parkway	C	27.0	C	27.5	D	30.4
NB on from Harney Way[b]	C	20.2	F	>45	F	>45
NB on from Bayshore	D	31.2	C	22.5	C	23.6
NB on from Alemany/Industrial	E	36.4	F	>45	F	>45
NB on from Bayshore/Cesar Chavez	F	>45	F	>45	F	>45
SB off to Bayshore/Cesar Chavez	F	>45	F	>45	F	>45
SB on from Cesar Chavez/Potrero	F	>45	F	>45	F	>45
SB on from Alemany/San Bruno	C	24.1	D	28.8	C	24.1
SB on from Third/Bayshore	D	30.0	F	>45	F	>45
SB on from Harney/Geneva[b]	D	29.7	F	>45	F	>45
SB on from Sierra Point/Lagoon	C	27.7	F	>45	F	>45
I-280						
NB off to Cesar Chavez	F	>45	F	>45	F	>45
NB on from Indiana/25th	D	33.4	F	>45	F	>45
SB off to Pennsylvania/25th	C	23.6	E	37.0	E	36.9
SB on from Pennsylvania/25th	C	22.9	E	36.3	E	36.1
WEEKDAY PM PEAK HOUR						
US-101						
NB on from Sierra Point Parkway	D	29.7	F	>45	F	>45
NB on from Harney Way[b]	D	30.0	F	>45	F	>45
NB on from Bayshore	D	28.6	D	27.9	D	30.0
NB on from Alemany/Industrial	D	30.2	E	35.9	F	>45

Table III.D-14 Ramp Junction LOS Existing, 2030 No Project and 2030 Project Conditions

	Existing		*2030 No Project*		*2030 Project*	
Ramp Location	*LOS*	*Density[a] (pc/mi/ln)*	*LOS*	*Density (pc/mi/ln)*	*LOS*	*Density (pc/mi/ln)*
NB on from Bayshore/Cesar Chavez	B	19.6	F	>45	F	>45
SB off to Bayshore/Cesar Chavez	F	>45	F	>45	F	>45
SB on from Cesar Chavez/Potrero	F	>45	F	>45	F	>45
SB on from Alemany/San Bruno	C	24.5	D	29.6	D	32.6
SB on from Third/Bayshore	C	26.5	F	>45	F	>45
SB on from Harney/Geneva[b]	C	24.2	D	31.9	F	>45
SB on from Sierra Point/Lagoon	C	26.5	C	22.7	D	28.5
I-280						
NB off to Cesar Chavez	D	28.4	F	>45	F	>45
NB on from Indiana/25th	C	27.4	F	>45	F	>45
SB off to Pennsylvania/25th	E	36.7	F	>45	F	>45
SB on from Pennsylvania/25th	E	38.5	F	>45	F	>45
SUNDAY PM PEAK HOUR						
US-101						
NB on from Sierra Point Parkway	B	19.3	A	9.1	A	9.8
NB on from Harney Way[b]	B	19.5	D	33.0	E	35.1
NB on from Bayshore	B	16.8	C	21.9	C	22.4
NB on from Alemany/Industrial	C	23.5	C	24.6	C	25.6
NB on from Bayshore/Cesar Chavez	C	26.1	D	31.7	F	>45
SB off to Bayshore/Cesar Chavez	E	37.5	F	>45	F	>45
SB on from Cesar Chavez/Potrero	D	30.6	F	>45	F	>45
SB on from Alemany/San Bruno	B	17.3	C	21.2	C	22.5
SB on from Third/Bayshore	B	16.5	C	23.9	D	26.1
SB on from Harney/Geneva[b]	B	18.7	C	24.8	D	29.8

Table III.D-14 Ramp Junction LOS Existing, 2030 No Project and 2030 Project Conditions

	Existing		*2030 No Project*		*2030 Project*	
Ramp Location	*LOS*	*Density[a] (pc/mi/ln)*	*LOS*	*Density (pc/mi/ln)*	*LOS*	*Density (pc/mi/ln)*
SB on from Sierra Point/Lagoon	B	18.3	C	21.6	C	22.6
I-280						
NB off to Cesar Chavez	B	19.2	C	26.0	D	26.0
NB on from Indiana/25th	B	18.4	C	25.6	D	25.8
SB off to Pennsylvania/25th	C	27.0	D	30.7	D	30.9
SB on from Pennsylvania/25th	C	26.4	D	29.5	D	29.5

SOURCE Fehr and Peers, 2009

a. Density of vehicles per segment. pc/mi/ln = passenger cars per mile per lane.
b. Cumulative 2030 No Project conditions assume the reconstruction of the Harney Way interchange, as well as the extension of Geneva Avenue from Bayshore Boulevard east to the reconstructed interchange.
c. Ramp junctions at LOS E or LOS F conditions highlighted in bold

Impact TR-14: Freeway Diverge Queue Storage Impacts

Impact TR-14 **Implementation of the Project could result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

Table III.D-15 (Freeway Diverge Queue Storage Existing, 2030 No Project, and Project Conditions) presents the results of the ramp queue storage analysis for existing, 2030 No Project and Project conditions at 15 ramp locations. The Project would result in increases in traffic volumes that would cause the US-101 northbound off-ramp to Harney Way to experience queues that may extend back to the upstream freeway mainline segment which could result in unsafe conditions on the freeway mainline. The Project would therefore result in significant traffic impacts at this location.

Table III.D-15 Freeway Diverge Queue Storage Existing, 2030 No Project, and Project Conditions

		Existing	*2030 No Project*	*Project*
Ramp Location	*Ramp Storage*	*95th % Queue[a]*	*95th % Queue*	*95th % Queue*
		WEEKDAY AM PEAK HOUR		
US-101				
NB off to Harney Way2	2,800	< 100	1,725	2,350
NB off to Bayshore/Cesar Chavez	750	400	Spillback	Spillback
SB off to San Bruno/Silliman	600	225	225	225
SB off to San Bruno/Mansell	650	< 100	< 100	<100
SB off to Bayshore/Hester	1,700	225	275	275
SB off to Harney/Geneva2	1,000	< 100	Spillback	Spillback
SB off to Sierra Point/Lagoon	1,250	< 100	Spillback	Spillback
I-280				
NB off to Cesar Chavez	2,500	1,500	Spillback	Spillback
SB on from Pennsylvania/25th	900	< 100	< 100	< 100
		WEEKDAY PM PEAK HOUR		
US-101				
NB off to Harney Way[b]	2,800	< 100	Spillback	Spillback
NB off to Bayshore/Cesar Chavez	750	375	525	525
SB off to San Bruno/Silliman	600	325	425	425
SB off to San Bruno/Mansell	650	150	350	350
SB off to Bayshore/Hester	1,700	225	125	125
SB off to Harney/Geneva[b]	1,000	< 100	Spillback	Spillback
SB off to Sierra Point/Lagoon	1,250	< 100	1,000	1,000

Table III.D-15 Freeway Diverge Queue Storage Existing, 2030 No Project, and Project Conditions

		Existing	*2030 No Project*	*Project*
Ramp Location	*Ramp Storage*	*95th % Queue*[a]	*95th % Queue*	*95th % Queue*
I-280				
NB off to Cesar Chavez	2,500	650	900	900
SB on from Pennsylvania/25th	900	< 100	875	875
SUNDAY PM PEAK HOUR				
US-101				
NB off to Harney Way[b]	2,800	< 100	1,450	Spillback
NB off to Bayshore/Cesar Chavez	750	275	350	350
SB off to San Bruno/Silliman	600	175	250	250
SB off to San Bruno/Mansell	650	< 100	< 100	100
SB off to Bayshore/Hester	1,700	300	300	325
SB off to Harney/Geneva[b]	1,000	< 100	Spillback	Spillback
SB off to Sierra Point/Lagoon	1,250	< 100	125	125
I-280				
NB off to Cesar Chavez	2,500	300	825	825
SB on from Pennsylvania/25th	900	< 100	150	175

SOURCE Fehr & Peers 2009

a. Ramps where there is potential for spillback are highlighted in bold.
b. 95th percentile queue is the length of queue that has a probability of 5 percent or less of being exceeded during the peak hour.
c. 2030 No Project conditions assume the reconstruction of the Harney Way Interchange as well as the connection of Geneva Avenue to the reconstructed interchange.

Mitigation measure MM TR-6 provides for the Project Applicant to pay a fair share toward the construction of the Harney Way Interchange Project, which could mitigate for the Project's contributions to this impact. Because the environmental review of the interchange project is not yet complete and the interchange project would be undertaken and approved by Caltrans, the implementation of mitigation measure MM TR-6 is uncertain and is outside the City/Agency jurisdiction. Therefore, Project-related impacts related to freeway diverge queue storage would be significant and unavoidable.

Impact TR-15: Contributions to Cumulative Freeway Diverge Queue Storage—Impacts

Impact TR-15 **Implementation of the Project could contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations (US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue). (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

The Project would also contribute cumulatively significant traffic increases at off-ramps where queues may extend onto freeway mainline segments under year 2030 No Project Conditions:

- US-101 northbound off-ramp to Harney Way
- US-101 northbound off-ramp to Bayshore/Cesar Chavez
- US-101 southbound off-ramp to Harney/Geneva
- US-101 southbound off-ramp to Sierra Point/Lagoon
- I-280 northbound off-ramp to Cesar Chavez

Mitigation measure MM TR-6 provides for the Project Applicant to pay a fair share toward the construction of the Harney Way Interchange Project, which could mitigate for the Project's contributions to this impact. Because the environmental review of the interchange project is not yet complete and the interchange would be undertaken and approved by Caltrans, the implementation of mitigation measure MM TR-6 is uncertain and is outside the City/Agency jurisdiction. Therefore, Project's contribution to impacts related to freeway diverge queue storage would remain significant and unavoidable.

Impact TR-16: Project and Cumulative Impacts on Harney Way

- **Impact TR-16** **Implementation of the Project would increase traffic volumes and would not make a considerable contribution to cumulative traffic volumes on Harney Way. (Less than Significant with Mitigation)** ***[Criterion D.a]***

As part of the Project, the existing four-lane Harney Way would be widened to the north and south of its existing alignment, and would be rebuilt to contain between two and three travel lanes in each direction, turn pockets, two BRT-only lanes, Class I and Class II bicycle facilities, new sidewalks, as well as a landscaped area. Initially, the roadway would be rebuilt as a new five-lane roadway (with right-of-way reserved for additional lane(s) to be built in the future as needed for increased traffic levels). There would be two lanes in each direction, with eastbound left-turn lanes at Thomas Mellon Circle and Executive Park Boulevard East and a westbound right-turn lane at the Executive Park Boulevard East intersection. A Class II bicycle lane would be provided on the north side of the roadway, and a Class I bicycle path would be provided on the south side of the roadway. Two exclusive BRT lanes would be constructed adjacent to the roadway on its north side. After 49ers games at the new stadium, left turns would be prohibited at the two Harney Way intersections with Thomas Mellon Drive and Executive Park Boulevard for a period to allow for the configuration of the roadway to change to four westbound auto lanes and one eastbound auto lane. Under the final configuration, a portion of the landscaped area installed as part of the initial widening would be rebuilt to provide additional lane(s) from the proposed Harney Interchange east to Arelious Walker Drive, if necessary.

The initial phase of Harney Way widening would provide for additional landscaping area (i.e., in the area that would be converted to future travel lane(s)), which would make the pedestrian crossing of Harney Way shorter than with the final configuration. Under both the initial and final configurations, pedestrian crosswalks would be provided at the signalized intersections of Harney Way with Jamestown Avenue, Executive Park East and Thomas Mellon Drive, and pedestrian crossing times would be provided consistent with the requirements of the California Manual of Uniform Traffic Control Devices (MUTCD).

Since the need for the final lane configuration on Harney Way would depend on the rate of buildout of the Project, as well as the rate and extent of buildout of cumulative development in the area such as the Executive Park development, further studies would be needed to determine if and when additional travel lanes are needed to accommodate the traffic volume demand.

- *MM TR-16* *Widen Harney Way as shown in Figure 5 in the Transportation Study. Prior to issuance of the grading permit for Development Phase 2 of the Project, the Project Applicant shall widen Harney Way as shown in Figure 5 in the Transportation Study. Prior to the issuance of grading permits for Phases 2, 3 and 4, the Project Applicant shall fund a study to evaluate traffic conditions on Harney Way and determine whether additional traffic associated with the next phase of development would result in the need to modify Harney Way to its ultimate configuration, as shown in Figure 6 in the Transportation Study, unless this ultimate configuration has already been built. This study shall be conducted in collaboration with the SFMTA, which would be responsible for making final determinations regarding the ultimate configuration. The ultimate configuration would be linked to intersection performance, and it would be required when study results indicate intersection LOS at one or more of the three signalized intersection on Harney Way at mid-LOS D (i.e., at an average delay per vehicle of more than 45 seconds per vehicle). If the study and SFMTA conclude that reconfiguration would be necessary to accommodate traffic demands associated with the next phase of development, the Project Applicant shall be responsible to fund and complete construction of the improvements prior to occupancy of the next phase.*

With implementation of the mitigation measure MM TR-16, Harney Way would be widened and improved to its final configuration when traffic demand warrants additional capacity. Therefore, potential Project impacts and Project contribution to cumulative impacts on traffic capacity on Harney Way would be reduced to less than significant as demonstrated in Table III.D-10, Table III.D-11, and Table III.D-12.

Impact TR-17: Project and Cumulative Transit Capacity Impacts

Impact TR-17 **Implementation of the Project would not exceed available transit capacity, because the Project and the Project's contribution to cumulative demand would be accommodated within the existing transit service, proposed TEP service, plus the service proposed as part of the Project. (Less than Significant with Mitigation) *[Criterion D.f]***

The Project would include substantial improvements to transit service in the Hunters Point Shipyard, Candlestick Point, and Bayview neighborhoods, in addition to improvements currently proposed as part of SFMTA's Transit Effectiveness Program. As discussed in Impact TR-18, the Project improvements to transit service, combined with existing service and proposed TEP improvements, would provide transit capacity to accommodate the new transit riders generated by the Project and by cumulative development.

Although the Project Description includes a plan for increased transit service to the study area (described in the "Analytic Method" section in Section III.D.4), because the final Transit Plan has not been formally approved by SFMTA, mitigation measure MM TR-17 is required to ensure the final Transit Plan will be prepared and implemented. Thus, mitigation measure MM TR-17 below requires preparation, approval, and implementation of the final transit-operating plan.

MM TR-17 *Implement the Project's Transit Operating Plan. The Project Applicant shall work with SFMTA to develop and implement the Project's Transit Operating Plan. Elements of the Project Transit Operating Plan shall include:*

- *Extension of the 24-Divisadero, the 44-O'Shaughnessy, and the 48-Quintara-24th Street into Hunters Point Shipyard.*
- *Increased frequency on the 24-Divisadero to 6 minutes in the AM and PM peak periods. Extension of the 29-Sunset from its current terminus near the Alice Griffith housing development,*

near Gilman Avenue and Giants Drive, into the proposed Candlestick Point retail area. The 29-Sunset would operate a short line between Candlestick Point and the Balboa Park BART station. This would increase frequencies on the 29-Sunset by reducing headways between buses from 10 minutes to 5 minutes during the AM and PM peak periods between Candlestick Point and the Balboa BART station. Every other bus would continue to serve the Sunset District (to the proposed terminus at Lincoln Drive and Pershing Drive in the Presidio) at 10-minute headways.

- *Convert T-Third service between Bayview and Chinatown via the Central Subway from one-car to two-car trains or comparable service improvement. Extension of the 28L-19th Avenue Limited from its TEP-proposed terminus on Geneva Avenue, just east of Mission Street, into the Hunters Point Shipyard transit center. The 28L-19th Avenue Limited would travel along Geneva Avenue across US-101 via the proposed Geneva Avenue extension and new interchange with US-101, to Harney Way. East of Bayshore Boulevard, the 28L-19th Avenue Limited would operate as BRT, traveling in exclusive bus lanes into the Candlestick Point area. The BRT route would travel through the Candlestick Point retail corridor, and cross over Yosemite Slough into the Hunters Point Shipyard transit center.*
- *The 28L-19th Avenue Limited would operate a short line to the Balboa Park BART station. This would increase frequencies on the 28L-19th Avenue Limited by reducing headways between buses from 10 minutes to 5 minutes for the segment between Hunters Point Shipyard and the Balboa Park BART station. Every other bus would continue to the Sunset District (to the proposed terminus at North Point Street and Van Ness Avenue) at 10-minute headways. If the TEP-proposed extension of the 28L has not been implemented by the SFMTA by the time implementation of this measure is called for in the Transportation Study (Appendix D), the Project Applicant shall fund the extension of that line between its existing terminus and Bayshore Boulevard.*
- *New CPX-Candlestick Express to downtown serving the Candlestick Point site, traveling along Harney Way (with potential stops at Executive Park), before traveling on US-101 toward downtown, terminating at the Transbay Terminal.*
- *New HPX-Hunters Point Shipyard Express to downtown serving the Hunters Point Shipyard site, traveling from the Hunters Point Shipyard Transit Center, along Innes Avenue, with stops at the India Basin and Hunters View areas, before continuing along Evans Avenue to Third Street, eventually entering I-280 northbound at 25th/Indiana. The HPX would continue non-stop to the Transbay Terminal in Downtown San Francisco.*

Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources. With implementation of the Transit Plan, Project-generated transit trips would be accommodated within the existing and proposed transit capacity, and therefore Project impacts on transit capacity would be less than significant.

Impact TR-18: Project and Cumulative Transit Impacts— Ridership and Capacity Utilization at Study Area Cordons

Impact TR-18 **With full implementation of the Project with proposed transit improvements, the Project demand and the Project's contribution to cumulative demand would not exceed the proposed transit system's capacity at the study area cordons. (Less than Significant with Mitigation) *[Criteria D.f, D.i]***

Full implementation of the Project's transit improvements would result in substantial increases in capacity for both the north/south and east/west lines serving the Project vicinity. Table III.D-16 (Comparison of

Capacity at Study Area Cordons Existing, 2030 No Project and Project Conditions— Weekday AM and PM Peak Hours) presents a comparison of the overall cordon capacity for Muni service for existing conditions, 2030 No Project conditions (with the TEP improvements assumed to be in place), and the Project conditions. Specifically, the Project would more than double overall east/west transit capacity at the cordon just east of Third Street (primarily due to the new BRT route). North-south transit capacity to the north of the Project site would double, and capacity to the south of the Project site would increase by more than 80 percent over the transit service proposed by the TEP.

Table III.D-16 Comparison of Capacity at Study Area Cordons Existing, 2030 No Project and Project Conditions— Weekday AM and PM Peak Hours

Cordon	*Existing Capacity*[a]	*2030 No Project TEP Capacity*[b]	*2030 Project Capacity*[c]
East of Third Cordon	1,715	1,715	3,988
North Cordon	2,085	1,769	3,546
West Cordon	2,033	2,224	4,002

SOURCE: SFMTA, Fehr & Peers

a. Capacity presented in riders per hour. Inbound and Outbound Capacity the same—one direction of capacity presented.
b. Year 2030 No Project reflects implementation of TEP recommendations for lines serving the study area. 19-Polk will no longer serve the study area, but will be replaced by the 48-Quintara, and the 56-Rutland will be eliminated.
c. Project conditions reflect TEP, plus Project improvements.

Table III.D-17 (Project Transit Trips and Capacity Utilization at Study Area Cordons Existing, 2030 No Project and Project Conditions—Weekday AM and PM Peak Hours) summarizes the capacity utilization for each of the three study area cordons for the AM and PM peak hours for the existing, 2030 No Project and Project conditions. With the transit capacity increases proposed by the Project, the total transit travel demand on Muni under Project conditions could be accommodated for each of the three cordons during the AM and PM peak hours. All three cordons would operate at less than Muni's 85 percent capacity utilization standards.

Table III.D-17 Project Transit Trips and Capacity Utilization at Study Area Cordons Existing, 2030 No Project and Project Conditions—Weekday AM and PM Peak Hours

	Existing		*2030 No Project*		*Project*	
Intersection	*Ridership*	*Capacity Utilization*	*Ridership*	*Capacity Utilization*	*Ridership*	*% Utilized*
AM PEAK HOUR						
East of Third Cordon						
Inbound	686	40%	1,353	79%	2,548	64%
Outbound	319	19%	1,577	92%	1,541	39%
North Cordon						
Inbound	859	41%	2,065	117%	2,458	69%
Outbound	754	36%	1,901	107%	2,151	61%
West Cordon						
Inbound	1,348	68%	2,053	92%	3,164	79%
Outbound	722	36%	1,536	69%	1,870	47%

Table III.D-17 Project Transit Trips and Capacity Utilization at Study Area Cordons Existing, 2030 No Project and Project Conditions—Weekday AM and PM Peak Hours

	Existing		*2030 No Project*		*Project*	
Intersection	*Ridership*	*Capacity Utilization*	*Ridership*	*Capacity Utilization*	*Ridership*	*% Utilized*
PM PEAK HOUR						
East of Third Cordon						
Inbound	389	23%	1,382	81%	2,002	50%
Outbound	253	15%	848	49%	2,092	52%
North Cordon						
Inbound	846	41%	2,049	116%	2,675	75%
Outbound	626	30%	1,628	92%	2,231	63%
West Cordon						
Inbound	711	36%	1,196	54%	1,938	48%
Outbound	824	42%	1,249	56%	2,374	59%

SOURCE: Fehr & Peers.

If Project-related transit capacity improvements are not provided, then only the capacity presented in Table III.D-16 for the 2030 No Project conditions would be available to accommodate Project and cumulative transit ridership. As indicated in Table III.D-17, under 2030 No Project conditions, the capacity utilization at the study area cordons is projected to exceed Muni's 85 percent capacity utilization standard. With the addition of Project-generated transit trips, the severity of the standard exceedance would increase, and would result in significant impacts. Because the final transit plan has not been formally approved by SFMTA, mitigation measure MM TR-17 is required to ensure the final Transit Plan will be prepared and implemented.

With implementation of mitigation measure MM TR-17, the Project's impacts and the Project's contribution to cumulative impacts on transit capacity at the study area cordons would be less than significant.

Impact TR-19: Project and Cumulative Impacts—Transit Capacity Utilization at Downtown Screenlines

Impact TR-19 **Implementation of the Project would add transit trips and the Project's contribution to cumulative transit trips to the Downtown Screenlines would not increase demands in excess of available capacity. (Less than Significant)** ***[Criterion D.f, D.i]***

Project transit improvements would not affect the capacity at the four Downtown Screenlines; however, a portion of the Project trips would cross the Southwest screenline and contribute to total ridership at this location. Table III.D-18 (Project Transit Trips and Capacity Utilization at Downtown Screenlines Existing, 2030 No Project and Project Conditions—Weekday AM and PM Peak Hours) summarizes the capacity utilization for the downtown screenlines for the AM and PM peak hours for the Project conditions. The Project would only add peak-direction riders through the Southeast downtown screenline. Ridership on other screenlines would remain unchanged from 2030 No Project conditions. With the addition of Project

trips all downtown screenlines would continue to operate with Muni's 85 percent utilization standard. Therefore, Project impacts on transit capacity at the Downtown Screenlines would be less than significant.

Table III.D-18 Project Transit Trips and Capacity Utilization at Downtown Screenlines Existing, 2030 No Project and Project Conditions—Weekday AM and PM Peak Hours

	Existing		*2030 No Project*		*Project*	
Intersection	*Ridership*	*Capacity Utilization*	*Ridership*	*Capacity Utilization*	*Ridership*	*%Util.*
AM Peak Hour						
Northeast	1,882	50%	3,008	78%	3,008	78%
Northwest	7,434	65%	8,949	75%	8,949	75%
Southeast	4,248	67%	7,248	71%	7,536	74%
Southwest	6,627	76%	7,674	76%	7,674	76%
Total All Screenlines	***20,191***	***67%***	***26,879***	***74%***	***27,167***	***75%***
PM Peak Hour						
Northeast	1,886	52%	3,140	67%	3,140	78%
Northwest	6,621	65%	8,155	70%	8,155	75%
Southeast	4,668	66%	7,733	78%	8,263	83%
Southwest	7,434	77%	8,829	82%	8,829	82%
Total All Screenlines	***20,609***	***68%***	***27,857***	***75%***	***28,347***	***80%***

SOURCE: Fehr & Peers.

Impact TR-20: Project and Cumulative Impacts—Transit Capacity and Utilization at Regional Screenlines

Impact TR-20 **Implementation of the Project would add transit trips and the Project's contribution to cumulative transit trips would not contribute significantly to Regional Screenlines conditions where overall ridership is projected to exceed available capacity. (Less than Significant)** ***[Criterion D.f, D.i]***

Project transit improvements would not affect the capacity of the Regional Screenlines; however, a portion of the Project trips would cross the East Bay, North Bay and South Bay screenlines and contribute to total ridership at these locations. Table III.D-19 (Project Transit Trips and Capacity Utilization at Regional Screenlines Project and Project Variants—Weekday AM and PM Peak Hours) summarizes the capacity utilization for the regional transit provider screenlines for the AM and PM peak hours for existing, 2030 No Project, and Project conditions. The Project would contribute small ridership increases to regional transit, with the greatest increase to and from the South Bay. The Project would contribute slightly fewer trips to the South Bay in the off-peak directions (southbound in the AM peak hour and northbound in the PM peak hour) than in the peak directions. Off-peak direction ridership would remain within available capacity in the AM and PM peak hours.

Table III.D-19 Project Transit Trips and Capacity Utilization at Regional Screenlines Project and Project Variants—Weekday AM and PM Peak Hours

	Existing		*2030 No Project*		*Project*	
Intersection	*Ridership*	*Capacity Utilization*	*Ridership*	*Capacity Utilization*	*Ridership*	*% Utilized*
AM PEAK HOUR						
East Bay						
BART	18,064	123%	36,202	185%	36,202	185%
AC Transit	1,670	55%	3,347	61%	3,347	61%
Ferries	667	56%	1,971	83%	1,971	83%
Subtotal	*20,401*	*108%*	*41,520*	*151%*	*41,520*	*151%*
North Bay						
Golden Gate Transit	1,510	57%	2,623	106%	2,621	106%
Ferries	949	56%	1,647	97%	1,647	97%
Subtotal	*2,459*	*56%*	*4,268*	*102%*	*4,268*	*102%*
South Bay						
BART	11,185	105%	12,409	89%	12,416	89%
Caltrain	2,128	65%	4,454	70%	4,451	70%
SamTrans	686	65%	794	75%	799	75%
Ferries	—	--	152	51%	152	51%
Subtotal	*13,999*	*94%*	*17,809*	*82%*	*17,818*	*82%*
Total All Screenlines	***36,859***	***96%***	***63,597***	***119%***	***63,606***	***119%***
PM PEAK HOUR						
East Bay						
BART	16,985	120%	30,241	154%	30,268	154%
AC Transit	2,517	60%	4,485	68%	4,485	68%
Ferries	702	46%	2,147	79%	2,147	79%
Subtotal	*20,204*	*102%*	*36,873*	*128%*	*36,900*	*128%*
North Bay						
Golden Gate Transit	1,397	63%	2,513	114%	2,513	114%
Ferries	906	53%	1,630	96%	1,630	96%
Subtotal	*2,303*	*59%*	*4,143*	*106%*	*4,143*	*106%*
South Bay						
BART	9,545	92%	10,631	76%	10,707	76%
Caltrain	1,986	61%	3,959	62%	4,008	63%
SamTrans	575	61%	362	39%	404	43%
Ferries	—	—	75	25%	75	25%
Subtotal	*12,106*	*83%*	*15,027*	*69%*	*15,194*	*70%*
Total All Screenlines	***34,613***	***90%***	***56,043***	***103%***	***56,237***	***103%***

SOURCE: Fehr & Peers.

BART to the East Bay and Golden Gate Transit to the North Bay are projected to exceed operating standards under 2030 conditions during both the weekday AM and PM peak hours. Project contributions to these Screenlines would be minimal (fewer than 50 transit riders). Therefore, the Project impacts and the Project's contribution to cumulative impacts on Regional transit capacity would be less than significant.

Impact TR-21: Project and Cumulative Transit Operations Impacts—9-San Bruno

Impact TR-21 **Implementation of the Project could increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. (Significant and Unavoidable with Mitigation) *[Criterion D.i]***

Project-related transit delays due to congestion on study area roadways and passenger loading delays associated with increased ridership would result in significant impacts on the operation of the 9-San Bruno. Within the study area, the 9-San Bruno would experience substantial delays at key intersections along San Bruno Avenue, including at Silver Avenue, Silliman Avenue, Paul Avenue/Dwight Street, and at Mansell Street. Overall, the Project-related congestion would add up to 8 minutes of delay per bus during peak hours. The provision of transit-only lanes on San Bruno Avenue, and other transit-priority treatments would reduce travel time delays and impacts on this line.

MM TR-21.1 *Maintain the proposed headways of the 9-San Bruno. To address Project impacts to the 9-San Bruno, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the San Bruno Avenue corridor, generally between Campbell Avenue and Silver Avenue. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 9-San Bruno.*

- *Install a transit-only lane on northbound San Bruno Avenue for the one-block section (400 feet) between Silliman Street and Silver Avenue. This would involve removal of five metered spaces on the east side of San Bruno Avenue, just south of Silver Avenue. Treatment for transit-only lanes can range from striping to physical elevation changes or barriers to protect transit right-of-way from mixed-flow traffic.*
- *Install a transit-only lane on southbound San Bruno Avenue at the approach to Dwight Street/Paul Avenue. This lane would function as a so-called "queue-jump" lane, allowing buses to bypass queues on southbound San Bruno Avenue at the intersection. The lane should begin approximately 200 feet north of Dwight Street and extend one block (about 300 feet) south of Paul Avenue to Olmstead Street. This would involve the removal of up to 20 on-street parking spaces on the west side of San Bruno Avenue. This treatment could be limited to peak hours only, which would minimize the impact of the parking loss. The segment of San Bruno Avenue between Dwight Street and Olmstead Street is designated as Bicycle Routes #705 and 5 (Class III signed routes).*
- *At the intersection of San Bruno/Silver install signal priority treatments on westbound Silver Avenue, where buses waiting to turn left from Silver Avenue onto southbound San Bruno Avenue must currently wait through almost an entire signal cycle due to the heavy oncoming traffic on eastbound Silver Avenue. Installation of a transit signal pre-emption at this location that provides a "green" signal for westbound vehicles but holds eastbound vehicles when buses are present would allow transit vehicles to turn left onto San Bruno Avenue without having to wait for opposing eastbound through traffic to clear.*

The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include comprehensive replacement of stop-controlled intersections with interconnected traffic signals equipped with transit priority elements.

MM TR-21.2 *Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 9-San Bruno. Should mitigation measure MM TR-21.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 9-San Bruno. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

- The treatments for Impact TR-21 contained in mitigation measure MM TR-21.1 combined could reduce AM peak hour travel times by 4 minutes and 6 seconds in the northbound direction, and 6 minutes 18 seconds in the southbound direction. During the PM peak hour, these treatments could reduce PM peak hour travel times by 4 minutes 6 seconds in the northbound direction and by 8 minutes in the southbound direction. With the combination of mitigation measures, transit travel times in each direction and during each peak period would be similar to 2030 No Project conditions. However, because 2030 No Project conditions constitute adverse delays to transit service, cumulative adverse delays to transit service would occur even with these Project transit mitigation measures. Because adverse transit delays affecting this line are generated by adverse traffic congestion to which the Project has a considerable contribution, the Project also has a cumulatively considerable contribution to adverse transit delays.

  Implementation of mitigation measure MM TR-21.2, on the other hand, would allow operation of headways as described under MM TR-17. However, given the congestion along the San Bruno Avenue corridor, implementation of MM TR-21.2 alone, without MM TR-21.1, might not be sufficient to reduce the impact to less-than-significant levels.

  Implementation of MM TR-21.1 would exacerbate LOS F conditions at the intersections of San Bruno/Silver, San Bruno/Silliman/US-101 Southbound off-ramp, and San Bruno/Paul that were identified as having significant and unavoidable impacts. Additional impacts of these mitigation measures would be similar to impacts addressed in this Section III.D.4 regarding traffic circulation, parking supply, loading supply and operations, and bicycle circulation. Impacts of the mitigation measures regarding air quality and noise levels would be similar to those identified in Section III.H (Air Quality) and Section III.I (Noise and Vibration), respectively.

  Because a feasibility study of the improvements contemplated in mitigation measure MM TR-21.1 would be required, implementation of MM TR-21.1 is uncertain. Because implementation of MM TR-21.2 alone, without MM TR-21.1, might not be sufficient to reduce the impacts on the 9-San Bruno to a less-than-significant level, the Project impacts on the 9-San Bruno would remain significant and unavoidable.

Impact TR-22: Project and Cumulative Transit Operations Impacts—23-Monterey, 24-Divisadero & 44-O'Shaugnessy

Impact TR-22 **Implementation of the Project would contribute traffic to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. (Significant and Unavoidable with Mitigation)** ***[Criterion D.i]***

Project-related transit delays due to congestion on study area roadways and passenger boarding delays associated with increased ridership would result in significant impacts on the operation of the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy. Along Palou Avenue these lines would be affected by the substantial congestion projected at the intersection of Third/Palou and the queues that would extend to the east and west of Third Street. Overall, the Project-related congestion would add up to 9 minutes of delay per bus during peak hours. The provision of transit-only lanes on Palou Avenue would reduce travel time delays and impacts on these lines.

MM TR-22.1 *Maintain the proposed headways of the 23-Monterey, 24-Divisidero and the 44-O'Shaughnessy. To address Project impacts to the 23-Monterey, 24-Divisidero and the 44-O'Shaughnessy, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the Palou Avenue corridor, generally between Griffith Street and Newhall Street. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 23-Monterey, 24-Divisidero and the 44-O'Shaughnessy.*

- *Convert one of the two westbound travel lanes on Palou Avenue between Keith Street and Newhall Street (three blocks) to a transit-only lane at all times. Treatment for transit-only lanes can range from striping to physical elevation changes to protect right-of-way from mixed-flow traffic. Because the westbound lanes between Third Street and Newhall Street are relatively narrow, parking would likely need to be prohibited on the north side of Palou Avenue between Third Street and Newhall Street (approximately 600 feet) during peak periods to maximize the effectiveness of the transit-only lane.*
- *Convert one of the two eastbound travel lanes on Palou Avenue between Newhall Street and Third Street (one block) to a transit-only lane at all times. Because the eastbound travel lanes between Newhall Street are relatively narrow, parking would likely need to be prohibited on the south side of Palou Avenue between Newhall Street and Third Street (approximately 600 feet) during peak periods to maximize the effectiveness of the transit-only lane. In the eastbound direction, east of Third Street, buses would re-enter the single mixed-flow traffic lane at the bus stop on the far (east) side of Third Street.*
- *There are currently pedestrian corner bulbs on the northwest and southwest corners of the intersection of Palou Avenue and Third Street. In order to accommodate the transit-only lanes west of Third Street, these bulbouts would be reconfigured or removed. Although removing pedestrian bulb-outs may increase pedestrian crossing distances and is generally inconsistent with the City's desire to prioritize pedestrian activity, in this case, the improvement would offer substantial benefits to transit travel times by allowing a transit-only lane through a congested intersection. This would be consistent with the City's transit-first policy.*

- *During the PM peak period only, prohibit parking on westbound Palou Avenue for the four-block segment between Griffith Street/Crisp Avenue and Keith Street, to provide for a PM peak period curb transit-only lane along this segment. This would create a continuous westbound transit-only lane on Palou Avenue between Griffith Street/Crisp Avenue and Newhall Street during the PM peak period.*
- *As an alternative to the bulleted measures above, narrow the existing sidewalks on Palou Avenue from Third Street to Crisp Avenue (seven blocks) from 15 feet to 12 feet in width. The pedestrian bulb-outs on the west side of Third Street would be removed. The resulting 12-foot-wide sidewalks would be consistent with the Better Streets Plan guidelines. The reduction in sidewalk width would allow for the provision of a 7-foot-wide on-street parking lane, an 11-foot-wide transit-only lane, and a 10-foot-wide mixed-flow lane in each direction on Palou Avenue. This would preserve on-street parking along the corridor and provide a seven-block transit-only lane on Palou Avenue between Griffith Street/Crisp Avenue and Newhall Street. Treatment for transit-only lanes can range from striping to physical elevation changes to protect right-of-way from mixed-flow traffic. Subsequent to publication of the Draft EIR, SFMTA and the Project Applicant conducted an evaluation of this alternative measure and determined that it is a feasible and viable alternative to the four bulleted items above.*

The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include signal priority treatments at other signalized intersections including at Bayshore/Cortland, Bayshore/Industrial, and Bayshore/Oakdale.

MM TR-22.2 *<u>Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 23-Monterey, the 24-Divisadero and the 44-O'Shaughnessy.</u> Should mitigation measure MM TR-22.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 23-Monterey, the 24-Divisadero and the 44-O'Shaughnessy. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

Implementation of the transit-only lanes would reduce travel times on the three routes:

- **23-Monterey**—The Project would not result in Project-specific impacts to the 23-Monterey because increases in Project-generated vehicles would not increase intersection delay and transit travel times such that additional transit vehicles would be required to maintain the proposed headways. However, it would contribute to cumulatively significant impacts identified for the 2030 No Project condition. The mitigation measures identified for Palou Avenue would improve service on the 23-Monterey, but the route would continue to experience cumulatively significant impacts.
- **24-Divisadero**—Mitigation measure MM TR-22.1 could reduce AM peak hour travel times by 4 minutes and 43 seconds in the westbound direction and by 4 minutes in the eastbound direction. During the PM peak hour travel times could be reduced by 8 minutes and 16 seconds in the westbound direction and by 4 minutes in the eastbound direction. In each direction during the PM peak hour, the transit travel times with the Project might remain greater than the 2030 No Project travel times by more than ½ headway, and therefore additional transit vehicles may still be required.
- **44-O'Shaughnessy**—The improvements along Palou Avenue between Keith Street and Newhall Street would improve the travel times on the 44-O'Shaughnessy such that in each direction and peak hour, the transit travel times with the Project would not be greater than the 2030 No Project travel

times by more than ½ headway, and therefore additional vehicles would not be required to maintain the proposed headways.

- With the treatments identified in mitigation measure MM TR-22.1, transit travel times in some directions and during some peak periods would be no greater than for 2030 No Project conditions. However, because 2030 No Project conditions constitute adverse delays to transit service, cumulative adverse delays to transit service would occur even with these Project transit mitigation measures. Because adverse transit delays affecting this line are generated by adverse traffic congestion to which the Project has a considerable contribution, the Project also has a cumulatively considerable contribution to adverse transit delays.

Implementation of mitigation measure MM TR-22.2, on the other hand, would allow operation of headways as described under MM TR-17. However, given the congestion along the Palou Avenue corridor, implementation of MM TR-22.2 alone, without MM TR-22.1, might not be sufficient to reduce the impact to less-than-significant levels.

Implementation of MM TR-22.1 would also exacerbate automobile LOS F conditions at the intersection of Third/Palou that would have significant and unavoidable impacts under Project conditions. In addition, these measures may result in new significant and unavoidable impacts at intersections along Palou Avenue (i.e., at Griffith/Crisp, Ingalls, Jennings, Lane, Keith Streets). Additional impacts of these mitigation measures would be similar to impacts addressed in this Section III.D.4 regarding traffic circulation, parking supply, loading supply and operations, and bicycle circulation. Impacts of the mitigation measures regarding air quality and noise levels would be similar to those identified in Section III.H and Section III.I, respectively.

Because a feasibility study of the improvements contemplated in mitigation measure MM TR-22.1 would be required, implementation of MM TR-22.1 is uncertain. Because implementation of MM TR-22.2 alone, without MM TR-22.1, might not be sufficient to reduce the impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy to a less-than-significant level, the Project impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy would remain significant and unavoidable.

Impact TR-23: Project and Cumulative Transit Operations Impacts—29-Sunset

Impact TR-23 **Implementation of the Project would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. (Significant and Unavoidable with Mitigation) *[Criterion D.i]***

Project-related transit delays due to congestion on study area roadways and passenger loading delays associated with increased ridership would result in significant impacts on the operation of the 29-Sunset. Within the study area, the 29-Sunset would experience substantial delays at key intersections along Gilman Avenue and Paul Avenue, particularly at Third Street and Bayshore Boulevard. Overall, the Project-related
- congestion would add up to 21 minutes of delay per bus during peak hours. The provision of transit-only lanes on Gilman Avenue and Paul Avenue would reduce travel time delays and impacts on this line.

MM TR-23.1 *<u>Maintain the proposed headways of the 29-Sunset.</u> To address Project impacts to the 29-Sunset, prior*
- *to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements*

which could reduce Project impacts on transit operations along the Gilman Avenue and Paul Avenue corridor, generally between Arelious Walker Drive and Bayshore Boulevard. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 29-Sunset.

- *For the five-block segment of Gilman Avenue between Arelious Walker Drive and Third Street, prohibit on-street parking on westbound Gilman Avenue during the AM and PM peak periods to provide for three westbound travel lanes. During the peak periods convert one of the three westbound travel lanes to transit-only. During off-peak periods, parking would be allowed, and buses would travel in one of the two mixed-flow lanes. The peak period transit lanes would impact 90 parking spaces.*
- *For the same five-block segment of Gilman Avenue between Arelious Walker Drive and Third Street, restripe the eastbound direction to provide two travel lanes, one of which would accommodate on-street parking and one of which would be a mixed-flow travel lane. During the AM and PM peak periods, prohibit on-street parking in the eastbound direction, and operate one of the two eastbound lanes as transit-only lanes. The peak period transit lanes would impact 80 parking spaces.*
- *As an alternative to the two bulleted measures above, convert one of the travel lanes in each direction on Gilman Avenue from Third Street to Griffith Street to transit-only. This would allow for the provision of a 7-foot-wide on-street parking lane, an 11-foot-wide transit-only lane, and a 10-foot-wide mixed-flow lane in each direction on Gilman Avenue. This would preserve on-street parking along the corridor and provide four-block transit-only lanes on Gilman Avenue between Griffith Street and Third Street. Treatment for transit-only lanes can range from striping to physical elevation changes to protect right-of-way from mixed-flow traffic. Subsequent to publication of the Draft EIR, SFMTA and the Project Applicant conducted an evaluation of this alternative measure and determined that is a feasible and viable alternative to the two bulleted items above,*
- *Prohibit on-street parking on the north side of Paul Avenue, between Third Street and Bayshore Boulevard to create two westbound through lanes. Convert one westbound through lane to transit-only in the AM and PM peak periods. The peak period transit-only lane would impact 40 parking spaces. At the intersection of Paul Avenue and Bayshore Avenue, provide transit signal priority treatment (i.e., queue jump) to allow transit vehicles to maneuver into the mixed flow left-hand lane, facilitating a left-turn movement immediately west of Bayshore Boulevard from westbound Paul Avenue to southbound San Bruno.*

The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include transit priority treatments on San Bruno Avenue, on the portions where the 29-Sunset travels.

MM TR-23.2 *<u>Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 29-Sunset.</u> Should mitigation measure MM TR-23.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 29-Sunset. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

- Implementation of transit-only lanes identified in mitigation measure MM TR-23.1 could reduce AM peak hour transit travel times by 5 minutes and 17 seconds in the westbound direction and 5 minutes and 59 seconds in the eastbound direction. During the PM peak, these measures would reduce transit travel times by 6 minutes and 25seconds in the westbound direction and by 1 minute in the eastbound direction. With the mitigation measures, transit travel times would remain greater than for 2030 No Project conditions. Because 2030 No Project conditions constitute adverse delays to transit service, cumulative adverse delays to transit service would occur even with these Project transit mitigation measures. Because adverse transit delays affecting this line are generated by adverse traffic congestion to which the Project has a considerable contribution, the Project also has a cumulatively considerable contribution to adverse transit delays.

- Given the congestion along the Gilman Avenue corridor, implementation of MM TR-23.2 alone, without MM TR-23.1, might not be sufficient to reduce the impact to less-than-significant levels.

Implementation of MM TR-23.1 would also exacerbate automobile LOS F conditions at the intersection of Third/Paul and Paul/Bayshore that was identified as having significant and unavoidable impacts. Additional impacts of these mitigation measures would be similar to impacts addressed in this Section III.D.4 regarding traffic circulation, parking supply, loading supply and operations, and bicycle circulation. Impacts of the mitigation measures regarding air quality and noise levels would be similar to those identified in Section III.H and Section III.I, respectively.

Because a feasibility study of the improvements contemplated in mitigation measure MM TR-23.1 would be required, implementation of MM TR-23.1 is uncertain. Because implementation of MM TR-23.2 alone, without MM TR-23.1, might not be sufficient to reduce the impacts on the 29-Sunset to a less-than-significant level, the Project impacts on the 29-Sunset would remain significant and unavoidable.

Impact TR-24: Project and Cumulative Impacts to Transit Operations—48-Quintara-24th Street

Impact TR-24 **Implementation of the Project would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. (Significant and Unavoidable with Mitigation)** ***[Criterion D.i]***

Project-related transit delays due to congestion on study area roadways and passenger loading delays associated with increased ridership would result in significant impacts on the operation of the 48-Quintara-24th Street. Within the study area, the 48-Quintara-24th Street would experience substantial delays at key intersections along Evans Avenue, particularly at the key intersections with Third Street, Napoleon/Toland

- Streets and at Cesar Chavez Street. Overall, the Project-related congestion would add up to 8 minutes of delay per bus during peak hours. The provision of transit-only lanes on Evans Avenue and other transit-priority treatments would reduce travel time delays and impacts on this line.

- *MM TR-24.1* *Maintain the proposed headways of the 48-Quintara-24th Street. To address Project impacts to the 48-Quintara-24th Street, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvements which could reduce Project impacts on transit operations along the Evans Avenue corridor, generally between Hunters Point Boulevard and Napoleon Street. The study shall*

create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the 48-Quintara-24th Street.

- *On Evans Avenue, between Jennings Street and Napoleon Street (a nine-block segment—about 6,000 feet), convert one of the two travel lanes in each direction to a transit-only lane at all times. Treatment for transit-only lanes can range from striping to physical elevation changes or barriers to protect transit right-of-way from mixed-flow traffic.*

The Project Applicant shall fully fund the costs of implementing the transit priority improvements (either the improvements identified above, or alternative improvements of equal or greater effectiveness and comparable cost) as determined by the study and the monitoring program. Other options to be evaluated in the study could include extension of transit only lanes in one or both directions between Napoleon Street and Cesar Chavez Street or onto Hunters Point Boulevard and Innes Avenue.

MM TR-24.2 *Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 48-Quintara-24th Street. Should mitigation measure MM TR-24.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 48-Quintara-24th Street. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

Provision of the transit-only lane on Evans Avenue, as identified in mitigation measure MM TR-24.1 would reduce AM peak hour transit travel times by 104 seconds in the westbound direction, and by 3 minutes and 50 seconds in the eastbound direction. During the PM peak hour transit travel times would be reduced by 58 seconds in the westbound direction, and by 13 minutes and 31 seconds in the eastbound direction. With the combination of mitigation measures, transit travel times in each direction and during each peak period would be no more than ½ headway greater than for 2030 No Project conditions. However, because 2030 No Project conditions constitute adverse delays to transit service, cumulative adverse delays to transit service would occur even with these Project transit mitigation measures. Because adverse transit delays affecting this line are generated by adverse traffic congestion to which the Project has a considerable contribution, the Project also has a cumulatively considerable contribution to adverse transit delays.

Implementation of mitigation measure MM TR-24.2, on the other hand, would allow operation of headways as described under MM TR-17. However, given the congestion along Evans Avenue, implementation of MM TR-24.2 alone, without MM TR-24.1, might not be sufficient to reduce the impact to less-than-significant levels.

Implementation of mitigation measure MM TR-24.1 would also exacerbate automobile LOS F conditions at some intersections that were identified as significant and unavoidable impacts. In addition, it would ultimately be at SFMTA's discretion whether the transit-only lane would be implemented in the center lanes or in the lanes adjacent to the curb. Implementation of center-running lanes may have some operational benefit (depending on the results of feasibility study to be conducted if conditions warrant implementation of this measure), center-running lanes may result in loss of some additional on-street parking near stop platforms. Additional impacts of these mitigation measures would be similar to impacts addressed in this Section III.D.4 regarding traffic circulation, parking supply, loading supply and operations, and bicycle circulation. Impacts of the mitigation measures regarding air quality and noise levels would be similar to those identified in Section III.H and Section III.I, respectively.

Because a feasibility study of the improvements contemplated in mitigation measure MM TR-24.1 would be required, implementation of MM TR-24.1 is uncertain. Because implementation of MM TR-24.2 alone, without MM TR-24.1, might not be sufficient to reduce the impacts on the 48-Quintara-24th Street to a less-than-significant level, the Project impacts on the 48-Quintara-24th Street would remain significant and unavoidable.

Impact TR-25: Project and Cumulative Impacts to Transit Operations: 54-Felton

Impact TR-25 **Implementation of the Project would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. (Significant and Unavoidable with Mitigation) *[Criterion D.i]***

Additional traffic congestion associated with Project vehicle trips would result in significant impacts to the operations of the 54-Felton, particularly during the PM peak hour. Overall, the Project-related congestion would add up to 6 minutes of delay per bus during peak hours. However, unlike many of the other transit routes within the study area, the 54-Felton provides a relatively circuitous neighborhood collector service, which typically includes a number of turns and short distances on individual streets. As a result, mitigation measures that provide transit-only lanes are not practical due to the difficulty of accommodating turning movements at intersections. Further, although the 54-Felton would travel along Third Street between Palou Avenue and Hudson Street, relocating the 54-Felton to the dedicated light rail transit right-of-way in the center of Third Street would not be feasible because the train platforms are high-floor and on the left-hand side and buses load and unload from the right-hand side at low-floor stops. There is not adequate space in the existing right-of-way to provide new platforms to load and unload passengers from a bus in this area.

MM TR-25 *Purchase additional transit vehicles to mitigate the Project impacts and Project contribution to cumulative impacts to headways on 54-Felton. SFMTA shall purchase additional transit vehicles to mitigate the Project impacts and Project contribution to cumulative impacts to headways on 54-Felton. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

While the provision of additional transit vehicles for the 54-Felton would reduce impacts associated with increased travel times, the transit vehicles would still be subject to delays resulting from increased congestion, and therefore Project impacts on the 54-Felton would remain significant and unavoidable.

Impact TR-26: Project and Cumulative Impacts to Transit Operations: T-Third

Impact TR-26 **Implementation of the Project would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. (Significant and Unavoidable with Mitigation) *[Criterion D.i]***

Project-related transit delays due to congestion on Third Street and passenger loading delays associated with increased ridership would result in significant impacts on the operation of the T-Third. Within the study area, the T-Third would primarily experience delays related to increased traffic volumes within the segment between Thomas Avenue and Kirkwood Avenue where the light rail operates within a mixed-flow travel lane. Along the remainder of Third Street and Bayshore Boulevard, the T-Third operates within an exclusive right-of-way. Overall, the Project-related congestion would add up to 3 minutes of delay per

- vehicle during peak hours. Providing exclusive right-of-way for the T-Third in the segment between Thomas Avenue and Kirkwood Avenue would reduce travel time delays for the T-Third.

- *MM TR-26.1* *Maintain the proposed headways of the T-Third. To address Project impacts to the T-Third, prior to issuance of a grading permit for Development Phase 1, the Project Applicant in cooperation with SFMTA shall conduct a study to evaluate the effectiveness and feasibility of the following improvement that could reduce Project impacts on transit operations along Third Street between Thomas Avenue and Kirkwood Avenue. The study shall create a monitoring program to determine the implementation extent and schedule (as identified below) to maintain the proposed headways of the T-Third.*

  - *Reconfigure the section of Third Street between Thomas Avenue and Kirkwood Avenue (9 blocks) where the light rail vehicles currently share the travel lane with auto traffic to provide a dedicated transit right-of-way, consistent with the rest of the route. This would require either removal of one travel lane in each direction on Third Street, or removal of on-street parking and some sidewalk bulbouts. In addition, left-turns from Third Street in this segment would be restricted in both directions. Treatment for transit-only lanes can range from striping to physical elevation or barriers to protect transit right-of-way from mixed-flow traffic.*

- *Implementation of the roadway reconfiguration shall be the responsibility of SFMTA, and shall be implemented when the results of the study described above indicate transit improvements are necessary. The Project Applicant shall fully fund the costs of implementing the transit priority improvements prior to approval of subsequent phases of development.*

MM TR-26.2 *Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the T-Third. Should mitigation measure MM TR-26.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the T-Third. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

Providing an exclusive right-of-way for the T-Third as identified in mitigation measure MM TR-26.1 above, would reduce all delays associated with traffic congestion on Third Street during both AM and PM peak periods, such that transit travel times in year 2030 with the Project would be less than under than existing conditions.

Implementation of mitigation measure MM TR-26.2, on the other hand, would allow operation of headways as described under MM TR-17. However, given the congestion along Third Street, implementation of MM TR-26.2 alone, without MM TR-26.1, might not be sufficient to reduce the impact to less-than-significant levels.

- Implementation of mitigation measure MM TR-26.1 would also exacerbate automobile LOS F conditions at intersections along Third Street that were identified as significant and unavoidable impacts. Additional impacts of these mitigation measures would be similar to impacts addressed in this Section III.D.4 regarding traffic circulation, parking supply, loading supply and operations, and bicycle circulation. Impacts of the mitigation measures regarding air quality and noise levels would be similar to those identified in Section III.H and Section III.I, respectively.

Because a feasibility study of the improvements contemplated in mitigation measure MM TR-26.1 would be required, implementation of MM TR-26.1 is uncertain. Because implementation of MM TR-26.2 alone,

without MM TR-26.1, might not be sufficient to reduce the impacts on the T-Third to a less-than-significant level, the Project impacts on the T-Third would remain significant and unavoidable.

Impact TR-27: Project Impacts to Transit Operations: 28L-19th Avenue/Geneva Limited

Impact TR-27 **Implementation of the Project could increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. (Significant and Unavoidable with Mitigation)** ***[Criterion D.i]***

Increased congestion associated with Project vehicle trips would impact the operations of the 28L-19th Avenue/Geneva Limited, which would be a significant impact. In the Project vicinity, the 28L-19th Avenue/Geneva Limited would generally travel in the exclusive BRT lanes, but would be subject to delays at the intersection of Geneva Avenue and Bayshore Boulevard. Overall, the Project-related congestion would add up to 4 minutes of delay per bus during peak hours. The intersection of Bayshore/Geneva would be reconfigured as part of the Geneva Avenue Extension project, and the provision of transit-only lanes on Geneva Avenue on the eastbound and westbound approaches to the intersection would reduce the impact of cumulative congestion.

MM TR-27.1 *Ensure transit preferential treatment is accounted for in the design of the Geneva Avenue Extension. The City of Brisbane, as part of the Geneva Avenue Extension Project, shall account for existing traffic, background traffic growth, and the most recent forecasts of traffic expected to be associated with each of several adjacent development projects, including the Project. The San Francisco County Transportation Authority (SFCTA) and SFMTA shall coordinate with the City of Brisbane to ensure transit preferential treatment is accounted for in the design of the Geneva Avenue Extension.*

MM TR-27.2 *Purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 28L-19th Avenue/Geneva Limited. Should mitigation measure MM TR-27.1 not be feasible or effective, the Project Applicant shall work with SFMTA to purchase additional transit vehicles as necessary to mitigate the Project impacts and Project contribution to cumulative impacts to headways on the 28L-19th Avenue/Geneva Limited. Funds for the implementation of this mitigation measure are expected to be generated from a combination of Project revenues that accrue to the City, and other funding sources.*

Since implementation of mitigation measure MM TR-27.1 would be under the jurisdiction of the City of Brisbane, the implementation of the mitigation measure is uncertain. Implementation of MM TR-27.2, on the other hand, would allow operation of headways as described under MM TR-17. However, given the congestion along Geneva Avenue, implementation of MM TR-27.2 alone, without MM TR-27.1, might not be sufficient to reduce the impact to less-than-significant levels.

Because implementation of mitigation measure MM TR-27.2 alone, without MM TR-27.1, might not be sufficient to reduce the impacts on the 28L-19th Avenue/Geneva Limited to a less-than-significant level, the Project impacts on the 28L-19th Avenue/Geneva Limited would remain significant and unavoidable.

Impact TR-28: Project and Cumulative Impacts to Transit Operations of 9X, 9AX, 9BX- Bayshore Expresses and the 14X-Mission Express when on US-101

Impact TR-28 **Implementation of the Project would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101. (Significant and Unavoidable)** ***[Criterion D.i]***

As described above in Impact TR-11, the Project would contribute to cumulative traffic impacts on US-101 northbound and southbound. The projected increases in congestion would affect transit lines operating on US-101, notably the 9X, 9AX, and 9BX-Bayshore Expresses, and the 14X-Mission Express (the 14X-Mission Express operates southbound on US-101, and northbound on I-280). The Project's new CPX-Candlestick Express between Candlestick Point and downtown would also use US-101 and be subject to increased travel times due to freeway congestion. The impact on transit travel operations would be considered a significant impact.

Potential strategies to reduce congestion impacts on transit travel times could include bus-only operation on the shoulders of US-101, re-opening of the US-101 northbound Silver Avenue on-ramp for transit only, and creating transit-only lanes on I-280 along with rerouting of the transit lines to I-280. Additional studies and coordination with Caltrans would be required to determine the feasibility of these strategies. As feasibility of these strategies is uncertain, the impact on the 9X, 9AX, 9BX-Bayshore Expresses and the 14X-Mission Express operations would remain significant and unavoidable.

Impact TR-29: Project and Cumulative Impacts on Transit Operations on I-280—: 14X-Mission Express

Impact TR-29 **Implementation of the Project would not contribute to cumulative impacts on the 14X-Mission Express transit route when on I-280. (Less than Significant)** ***[Criterion D.i]***

As described above in Impact TR-11 and Table III.D-13 (Mainline and Weaving Segment LOS Existing, 2030 No Project and 2030 Project Conditions), the Project would not result in any Project-specific impacts on I-280, and would not contribute significantly to cumulative impacts. Project impacts on transit operations on I-280 would be less than significant.

Impact TR-30: Project and Cumulative Impacts on Regional Transit

Impact TR-30 **Implementation of the Project would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified. (Significant and Unavoidable)** ***[Criterion D.i]***

As described above in Impact TR-5 and Impact TR-11, the Project would increase congestion and contribute to cumulative traffic congestion on Bayshore Boulevard and on US-101, which would impact the travel times of SamTrans buses using these facilities. Potential strategies to reduce transit delay could

include providing transit-only lanes on Bayshore Boulevard, permitting bus-only use of the shoulders of US-101, and providing transit-only lanes on I-280 (and rerouting SamTrans buses from US-101 to I-280).

Additional studies and coordination with SamTrans, Caltrans, and the City of Brisbane would be required to determine the feasibility of these strategies. Since implementation of these strategies is uncertain the impact on SamTrans bus operations would remain significant and unavoidable.

Impact TR-31: Bicycle Network and Circulation

Impact TR-31 **During implementation of the Project, bicycle facilities would be expanded to serve additional users. This would be a beneficial impact of the Project. (No Impact) *[Criterion D.k]***

The street network proposed for Candlestick Point would be an extension of the existing grid of the adjacent Bayview neighborhood, which would facilitate access between the new uses and the rest of San Francisco, and provide a connection between existing Bayview Hunters Point neighborhood and the existing and proposed waterfront amenities.

A number of existing and proposed Project roadways would include bicycle facilities in the form of bicycle lanes (Class II facilities) or signed routes (Class III facilities—e.g., roadways with sharrow designations) that would facilitate bicycling within and in the vicinity of the Project. Off-street Class I pathways would be provided around the bayside perimeter of Candlestick Point, across the proposed Yosemite Slough bridge, and into Hunters Point Boulevard via Crisp Road. Within the Project site, the Bay Trail would also be completed.

- Outside of the Project site, street improvements would include striping of bicycle lanes on Innes Avenue, Jamestown Avenue and on Harney Way. As noted in Section III.D.3 (Regulatory Framework), the *San Francisco Bicycle Plan* includes a near-term project on Innes Avenue (Bicycle Route #68) between Donahue Street and Hunters Point Boulevard; however, a preferred option was not identified in the Final EIR for the Bicycle Plan. The Project proposes to provide a bicycle lane in both directions on Innes Avenue between Donahue Street and Hunters Point Boulevard, which would require removal of on-street parking on the south side of Innes Avenue between Earl Street and Hunters Point Boulevard. The Project proposal is consistent with Option 1 in the Bicycle Plan, however, it would not preclude implementation of Option 2 (sharrows added to the existing Class III facility), if that option were determined to be preferable by SFMTA. The Project would improve Gilman Avenue, and a Class III bicycle route with sharrow designations would be provided between Arelious Walker Drive and Third Street.

Overall, bicycle access and the environment for bicycling would improve within and in the vicinity of the Project site. The facilities would be adequate to meet the bicycling demand associated with the Project uses.

Impact TR-32: Project and Cumulative Impact on Bicycle Circulation on Palou Avenue

Impact TR-32 **Implementation of the Project's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue could result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. (Significant and Unavoidable with Mitigation) *[Criterion D.k]***

Outside of the Project site Bicycle Route #70 and Bicycle Route #170 on Palou Avenue are designated as Class III signed routes, and the combination of the proposed transit preferential treatment and the substantial increase in traffic volumes and congestion would result in potentially significant impacts on bicycle travel on this route. When faced with traffic congestion and a constrained bicycle environment, bicyclists may chose to ride on other streets not designated as part of the bicycle route network. The bicycle route could be relocated to a parallel route, such as either Quesada Avenue or Revere Avenue. Both of these streets provide a more level terrain than Palou Avenue.

MM TR-32 *Determine the feasibility of relocating Bicycle Routes #70 and #170. Prior to issuance of the grading permit for Development Phase 1, the Project Applicant shall fund a study to determine the feasibility of relocating Bicycle Routes #70 and #170. The study of the bicycle route relocation, necessary environmental clearance documentation, and implementation shall be the responsibility of SFMTA.*

Because a feasibility study of the relocation of Bicycle Routes #70 and #170 on Palou Avenue would be required, the implementation of MM TR-32 is uncertain, and therefore the Project impact on bicycle circulation would remain significant and unavoidable.

Impact TR-33: Pedestrian Circulation

Impact TR-33 **During implementation of the Project, pedestrian facilities would be expanded to serve additional users. This would be a beneficial impact of the Project. (No Impact) *[Criterion D.j]***

The street network proposed for Candlestick Point would be an extension of the existing grid of the adjacent Bayview neighborhood, which would facilitate access between the new uses and the rest of San Francisco, and provide a connection between existing Bayview neighborhood and the existing and proposed waterfront amenities. Other pedestrian amenities in both Candlestick Point and Hunters Point Shipyard would include crosswalks at unsignalized intersection, pedestrian crosswalks and signals at all new signalized intersections, corner bulbouts, and completion of sidewalk network where currently incomplete (e.g., Arelious Walker Drive, Palou Avenue). Along Gilman Avenue between Earl Street and Hunters Point Boulevard, and on Palou Avenue and Gilman Avenue between Arelious Walker Drive and Third Street, sidewalks would be reconstructed and landscaping improvements would be implemented.

Sidewalk widths on new or improved streets within the Project site would range from 10 feet to 15 feet in width, with the majority of streets having sidewalks 12 feet or greater in width. The Project would also include new sidewalks, and minor sidewalk narrowing on a number of existing streets, including:

- Griffith Street—narrow east and west sidewalks between Palou Avenue and Thomas Avenue from 12 to 11 feet

- Thomas Avenue—narrow north and south sidewalks between Griffith Street and Ingalls Street from 15 to 12 feet
- Ingalls Street—narrow east and west sidewalks between Yosemite Avenue and Carroll Avenue from 15 to 11 feet
- Carroll Avenue—new 12-foot-wide sidewalks between Ingalls Street and Arelious Walker Drive
- Harney Way—new 15-foot-wide sidewalk on north side from Thomas Mellon Drive to Jamestown Avenue

Overall, with the Project, pedestrian access would improve over the 2030 No Project conditions, except where sidewalks would be narrowed. The proposed narrowing of sidewalks would still allow for maintenance of sufficient clear space for people using walking aids or wheelchairs, as needed to meet ADA requirements. Development of the Project would increase pedestrian presence in the area. Since pedestrian volumes within the Project site are very low, the addition of pedestrian trips associated with the Project would be accommodated within the existing and proposed sidewalk network.

Impact TR-34: Project and Cumulative Pedestrian Safety Impacts Due to Increases in Traffic Volumes

Impact TR-34 **Implementation of the Project would result in traffic volumes on area roadways that would not substantially affect pedestrian circulation and safety in the Project vicinity. (Less than Significant)** ***[Criterion D.j]***

A qualitative assessment was also conducted of potential pedestrian impacts resulting from increased travel demand outside of the Project site. As noted in previous sections, the Project would increase vehicle and bicycle volumes in the Bayview Hunters Point area, which would increase the potential for pedestrian-vehicle and pedestrian-bicycle conflicts particularly in locations where the sidewalk network is incomplete or where vehicles park on sidewalks, causing pedestrians to walk in the roadway and mix with vehicular traffic. The Project-proposed sidewalk network improvements on Innes Avenue, Palou Avenue, Gilman Avenue, and Jamestown Avenue would improve and define the pedestrian network on these roadways. Along Third Street sidewalks have been improved and pedestrian signals and crosswalks were installed as part of the Third Street light rail project. As cumulative development occurs within the area, individual development projects would be required to address any sidewalk deficiencies adjacent to their site.

With the Project, the number of pedestrians on streets outside of the Project site would increase as a result of the expanded recreational uses, extension of transit lines, and overall increase in commercial activity in the area. While the presence of an increased number of pedestrians may partially offset risks associated with increased pedestrian-vehicle and pedestrian-bicycle conflicts, the enhanced pedestrian network and "safety in numbers" conditions due to increased pedestrian presence would cause drivers to expect and adapt to increased interactions with pedestrians.

SFMTA and SFCTA have recognized the existing inadequacies in the Bayview Hunters Point area to the pedestrian network. SFMTA has begun implementing the Bayview Traffic Calming Project, which was developed through a community-based process that identified problem locations with a study area roughly bounded by Jamestown Avenue, Third Street and Evans Avenue, and traffic calming measures. Community concerns included high traffic volumes, numerous trucks, speeding cars, and reckless driving.

The study resulted in a list of traffic calming measures (such as gateway islands, speed humps, speed cushions, and traffic circles) along specific roadways. Implementation of improvements is being phased in, and most cost-efficient solutions are being implemented first. The Project improvements would not preclude implementation of the traffic calming measures and would complement the goals of the community to enhance pedestrian safety. SFCTA has recently initiated the Bayview Hunters Point Neighborhood Transportation Plan (NTP) study that is focusing on the existing needs and concerns of the community, to develop smaller-scale solutions that could be implemented in the near-term. Measures such as better bus stops, brighter lighting, and landscaping, as well as parking management and mobility strategies such as shuttle service will be explored with the community.

The San Francisco Department of Public Health (DPH) analyzes pedestrian injuries in traffic accidents from a public health perspective. DPH notes that traffic accidents in general are a leading cause of death and injury in the United States. Beyond direct injuries and deaths, as matter of public health, DPH states that increased pedestrian safety can encourage walking, which in turn can have direct health benefits such as reducing obesity and indirect benefits such as improved air quality resulting from lesser traffic volumes.

There are a number of factors that contribute to increased pedestrian-vehicle collisions, and the number of collisions at an intersection is a function of the traffic volume, travel speeds, intersection configuration, traffic control, surrounding land uses, location, and number of pedestrians. The Project would result in a substantial change in the street network in the Project site, and includes street improvements that would enhance pedestrian safety in the Project site and beyond. The increased potential for pedestrian-vehicle conflicts and pedestrian injury would be tempered by the "safety in numbers" factor in an area currently characterized by low pedestrian volumes and mix of industrial and residential land uses. Overall, the existing and proposed pedestrian facilities would be adequate to meet the pedestrian demand associated with the Project land uses, and the Project impacts on pedestrian circulation within and in the vicinity of the Project would be less than significant.

Impact TR-35: Project and Cumulative Parking Impacts—Demand and Supply Comparison

Impact TR-35 **Implementation of the Project would not result in significant impacts associated with a lack of an adequate supply of parking that could not be accommodated within alternative modes. (Less than Significant)** ***[Criteria D.e and D.h]***

The parking impact assessment associated with the Project includes the comparison of the parking demand to the maximum off-street parking ratios for the Project as identified in the Project Description, plus the number of new on-street parking spaces that would be provided on new and reconfigured streets in the Project site. Since the Project proposes maximum permitted parking controls (not minimum requirements), the parking demand is also compared to conditions if no off-street parking is provided; that is, if only on-street parking spaces were provided.

Table III.D-20 (Summary of Project Parking Demand and Maximum Permitted Supply) summarizes the aggregate of the parking demand calculated for Project land uses, and also presents the maximum permitted off-street parking for the Project as well as the proposed number of new on-street parking spaces that

would be provided.[125] Figure III.D-12 (Project Parking Supply) presents the estimates of maximum off-street parking supply and on-street supply by area. Table III.D-21 (Summary of Project Parking Shortfalls for No Minimum and Maximum Permitted Supply) summarizes the parking demand, and the resultant parking shortfalls assuming Project parking supply for two scenarios: based on the maximum permitted supply; and, assuming provision of no off-street spaces but that only the on-street parking spaces would be available. Since the Project does not include minimum requirements (instead specifying the maximum parking supply that would be permitted) it is possible that the Project could be constructed without any off-street parking. However, most development projects in San Francisco develop the maximum permitted supply, and therefore the comparison of the parking demand to the maximum permitted off-street supply and to no off-street supply presents the range of potential parking impacts.

Table III.D-20 Summary of Project Parking Demand and Maximum Permitted Supply

	Demand				Supply[a]		
	Residential	Non-Residential		Total	Maximum Permitted	New	
Project Area	Long Term	Long Term	Short Term	Demand	Off Street[b]	On Street	Total
Hunters Point Shipyard	3,110	3,818	996	7,924	6,678	683	7,361
Candlestick Point	9,212	1,475	2,622	13,309	10,196	1,360	11.556
Total	***12,322***	***5,293***	***3,618***	***21,233***	***16,874***	***2,043***	***18,917***

SOURCE: CHS Consulting, LCW Consulting

a. Does not include stadium supply or game day demand.

b. Maximum number of spaces permitted per draft Design for Development standard for Candlestick Point Hunters Point Shipyard Phase II Development Plan.

Table III.D-21 Summary of Project Parking Shortfalls for No Minimum and Maximum Permitted Supply

		Minimum Supply		Maximum Supply	
Scenario/Project Area	Total Demand	Supply	Shortfall	Supply	Shortfall
Hunters Point Shipyard	7,924	683	- 7,241	7,361	- 563
Candlestick Point	13,309	1,360	- 11,949	11,556	- 1,753
Total	***21,233***	***2,043***	***- 19,190***	***18,917***	***- 2,316***

SOURCE: CHS Consulting, LCW Consulting

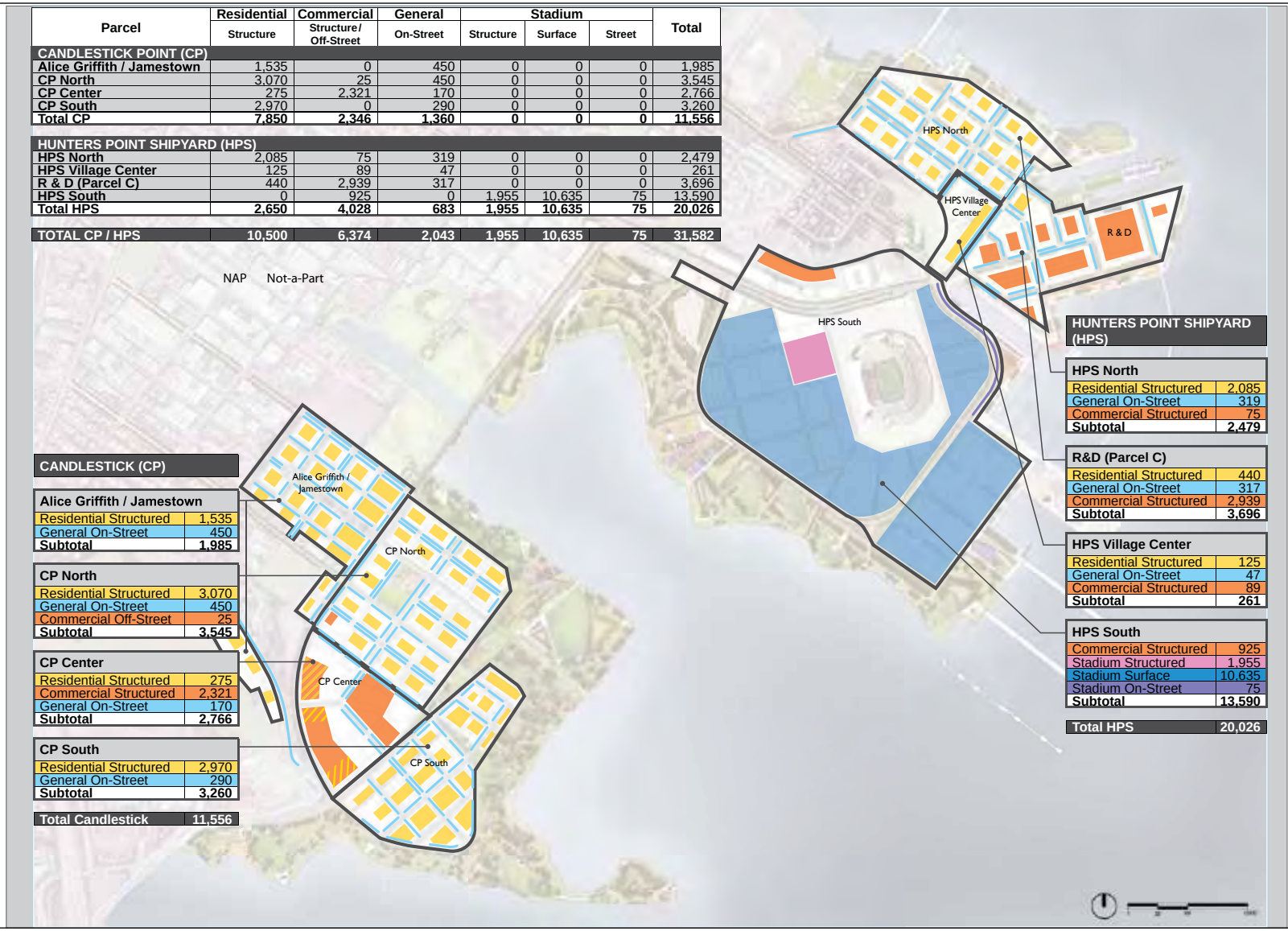
Includes off-street and new on-street supply; does not include stadium supply or game day demand.

As shown in Table III.D-20, the demand analysis indicates a Project need for about 21,233 spaces, compared with a maximum permitted supply of about 18,917 spaces; therefore, the maximum off-street parking supply would be approximately 2,316 spaces less than the estimated peak demand. Residential spaces would comprise approximately 79 percent of the total shortfall spaces, and non-residential commercial spaces the remaining 21 percent of the shortfall:

- The residential parking demand of 12,322 spaces, compared to a maximum permitted of 10,500 spaces (one space per unit), would result in a deficit of 1,822 spaces.

[125] The Project would include some on-street parking in the Project site for both commercial and general/residential uses. About 683 on-street spaces would be provided within Hunters Point Shipyard and 1,360 spaces within Candlestick Point for a total of 2,043 spaces.

Parcel	Residential	Commercial	General	Stadium			Total
	Structure	Structure/ Off-Street	On-Street	Structure	Surface	Street	
CANDLESTICK POINT (CP)							
Alice Griffith / Jamestown	1,535	0	450	0	0	0	1,985
CP North	3,070	25	450	0	0	0	3,545
CP Center	275	2,321	170	0	0	0	2,766
CP South	2,970	0	290	0	0	0	3,260
Total CP	7,850	2,346	1,360	0	0	0	11,556
HUNTERS POINT SHIPYARD (HPS)							
HPS North	2,085	75	319	0	0	0	2,479
HPS Village Center	125	89	47	0	0	0	261
R & D (Parcel C)	440	2,939	317	0	0	0	3,696
HPS South	0	925	0	1,955	10,635	75	13,590
Total HPS	2,650	4,028	683	1,955	10,635	75	20,026
TOTAL CP / HPS	10,500	6,374	2,043	1,955	10,635	75	31,582



SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-12

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT PARKING SUPPLY

- The non-residential demand would be 8,911 spaces, of which 41 percent would be needed for short-term use, while the remaining 59 percent would be needed for long-term use. The non-residential commercial parking demand, compared with a maximum permitted number of about 8,417 spaces, would result in a deficit of 494 spaces.

If no off-street parking is provided, the parking shortfall associated with the Project would increase substantially, and there would be a deficit of about 19,190 spaces. As indicated above, this represents the maximum shortfall, as it is anticipated that most, if not all, maximum permitted parking would likely be constructed.

Due to parking supply constraints and accessibility to transit, future Project parking demand may be somewhat lower than estimated, and therefore the parking space shortfall would also be less than presented above in Table III.D-21. Specifically:

- The parking demand estimates included in Table III.D-20 and Table III.D-21 represent the number of spaces that would be required in order to accommodate all the vehicles anticipated to result from the Project if the proposed parking supply was unconstrained. Since the parking supply would be constrained, the actual parking demand would be expected to be less.
- The parking demand estimates represent the peak parking demand calculated separately for each land use. Since all land uses do not experience the peak parking demands simultaneously, the peak parking demand may be less than presented. The Project-proposed parking ratios are generally less than the existing *Planning Code* requirement for similar uses to discourage auto use and to reflect the potential for shared parking opportunities among the various uses. For example, a restaurant can share parking with an office complex, since restaurant parking demand peaks in the evening, while office parking demand peaks during the middle of the day. Public parking facilities, such as the one proposed in Candlestick Point, and on-street parking spaces can usually be shared efficiently among many destinations. Accounting for the shared parking would reduce the non-residential parking demand, and the excess demand that would not be accommodated within the proposed parking supply would also be less.
- The Project includes a Travel Demand Management program that includes a number of parking strategies to make auto use and ownership less attractive, as well as strategies to encourage alternative modes. While the TDM program was assumed in developing Project travel demand, the residential parking demand was based on standard *SF Guidelines* parking demand rates that are based on Citywide averages.
- Residents within Hunters Point Shipyard and Candlestick Point would have new and improved existing transit routes connecting the Project site with downtown and with Caltrain and BART. Under Project conditions, capacity on local and regional lines would be available to accommodate additional Project transit trips.

As part of its "transit first" policy, the City and County of San Francisco does not require that the supply of parking spaces equals the demand. Consequently, even though it is anticipated that the Project would provide the maximum number of parking spaces permitted, they may not be sufficient to accommodate the actual demand. If fewer spaces than the maximum permitted were to be constructed, the projected shortfall would increase. Therefore, individuals who would prefer to drive may use transit because the perceived convenience of driving is lessened by a shortage of parking. This shortage is not considered a significant environmental effect because it implements a policy intended to reduce citywide traffic congestion and air quality effects. Even with a shortage of off-street parking, measures often are implemented that result in more efficient use of the parking spaces provided. By promoting carpooling,

allowing for the shared use of parking, and implementing pricing strategies designed to encourage short-term parking, the spaces provided for non-residential use would likely be used by more individuals, be vacant for shorter periods of time, and attract drivers needing short-term parking.

Since the proposed parking supply in the Project site would not meet demand, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the Project vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Residential streets near the Project site do not currently have parking restrictions and are about 70 percent occupied during the weekday midday and evening periods. Commercial and industrial spillover into residential areas is not expected to be a substantial problem because parking demand in residential areas in Bayview would be highest at night, when the commercial and industrial parking demand is lowest. If parking demand is found to exceed supply in the Bayview residential area, the City's residential parking permit program could be introduced to the area to help ensure availability of parking for local residents. The extent of spillover into the nearby industrial and residential neighborhoods to the west would be limited by the existing topography (e.g., steep grades due to the Bayview Hill), the distance between the Project site and available parking supply, and concerns related to safety in the industrial area. Transit service with available capacity and on-site carsharing services would provide an alternative to seeking parking supply further afield.

On days when events were scheduled at the stadium, parking spaces in the Bayview and Candlestick Point area would be in great demand. Those arriving to the Project vicinity on weekends after drivers have started arriving for the stadium event would have difficulty parking on event days unless they have already-reserve parking, such as spaces allocated to residential units.

Additionally, no cumulative parking impacts are expected. Other cumulative projects in the area, such as most of the surrounding existing development, Executive Park, and India Basin, are located too far from the Project site to expect that drivers going to other projects would seek parking on the Project site, or that drivers going to the Project site would park far outside the Project boundaries. Additionally, in some areas, the topography is not conducive to parking beyond the Project site boundaries. Consequently, there is no potential for significant cumulative parking impacts.

As noted above, in San Francisco, parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential social effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Project impacts on parking would be less than significant.

Impact TR-36: Loss of Existing On-Street Parking

Impact TR-36 **Implementation of the Project roadway improvements would displace on-street parking spaces, and the existing demand could be accommodated in the nearby vicinity. (Less than Significant) *[Criteria D.e and D.h]***

Some existing on-street parking spaces would be lost because of Project changes to the existing roadway configuration. The bus transit preferential treatments and streetscape improvements on Palou Avenue between Third Street and Griffith Street would result in a net loss of approximately 60 parking spaces (about 40 spaces due to bus stop improvements and corner bulbouts, and 20 spaces on the north side of the street between Ingalls and Griffith Streets where vehicles park perpendicular off-street within the sidewalk right-of-way). In addition, on the following streets a total of about 77 on-street parking spaces would be displaced:

- Carroll Avenue between Hawes and Ingalls Streets (26 spaces)
- Innes Avenue between Earl Street and Hunters Point Boulevard (51 spaces)

Project intersection improvements and mitigation measures would require removal of some on-street parking at the approaches to intersections. These on-street losses include:

- Evans/Jenning/Middlepoint—8 to 10 spaces on the west side of Jennings Street at the southbound approach to Evans.
- Palou/Griffith/Crisp—8 to 10 spaces on the east side of Griffith Street at the northbound approach.
- Carroll/Ingalls—8 to 10 spaces on the west side of Ingalls Street at the southbound approach.
- Blanken/Tunnel—13 spaces on the east side of Tunnel Avenue at the northbound and southbound approaches.

Project mitigation measures related to transit improvements would also result in peak period parking prohibitions. At some locations, such as on Third Street and Paul Avenue, parking spaces would be eliminated.

- San Bruno Avenue—5 spaces on the east side of San Bruno Avenue south of Silver Avenue, and 20 spaces on the west side of San Bruno Avenue between Woolsey Street and Olmstead Street.
- Palou Avenue—about 140 spaces on the north side and 130 spaces on the south side of Palou Avenue between Newhall Street and Crisp Avenue.
- Gilman Avenue—about 90 spaces on the north side and 80 spaces on the south side of Gilman Avenue between Arelious Walker Drive and Third Street.
- Paul Avenue—about 40 parking spaces on the north side of Paul Avenue between Third Street and Bayshore Boulevard.
- Third Street—about 110 spaces on the east and west curbs of Third Street between Thomas Avenue and Kirkwood Avenue.

The parking demand that would be displaced due to the temporary and permanent parking losses would be accommodated on other streets in the study area. At some locations, residents and visitors to commercial establishments would have to walk further between their parking space and destination, or switch to transit or other modes. The impact related to parking supply would be less than significant.

Impact TR-37: Loading Impacts

Impact TR-37 **Implementation of the Project would not result in significant impacts associated with a lack of adequate supply of loading spaces. (Less than Significant) *[Criterion D.1]***

Loading impacts assessment associated with the Project includes the comparison of the demand for the loading spaces to the minimum number of loading spaces specified in the Project description. As indicated in the "Analytic Method" section in Section III.D.4, the demand for loading spaces was estimated based on the development program and the daily truck trip generation rates for 1,000 gross square feet of use, then converted to hourly demand.

If the loading demand is not met on site and could not be accommodated within on-street loading zones, trucks could temporarily double-park and partially block local streets while loading and unloading goods which could result in disruptions and impacts to traffic and transit operations, as well as to bicyclists and pedestrians. Because any effects of unmet loading demand would be temporary inconveniences, any excess demand would not be a significant impact. The Project would establish a minimum number of loading spaces; more could be provided as part of individual development projects.

In addition to off-street facilities and on-street loading zones, approximately 300 feet of curb space on the Stadium Outer Ring Road would be designated for truck parking. The parking areas would have 17-foot-wide parking lanes that would fully accommodate wider trucks without impeding on adjacent bicycle or travel lanes. This designated truck parking area would meet the needs of truck drivers to take a ten-hour rest period that is governed by federal and state safety rules, and to stage when off-street loading facilities are not ready to accommodate deliveries. The designation of this on-street parking area would reduce the potential for truck drivers to seek long-term parking on residential streets in the Project site and within Bayview Hunters Point.

Table III.D-22 (Summary of Project Loading Demand and Supply) summarizes the estimate of daily truck trips generated by the proposed land uses and the associated demand for loading dock spaces during the peak hour of loading activities (which generally occurs between 10:00 a.m. and 1:00 p.m.) and the estimated supply. The estimated loading supply would be greater than the loading demand during the peak hour of loading operations. Within the Hunters Point Shipyard the loading demand and estimated supply would be similar, while within Candlestick Point the supply would substantially exceed the demand. This is due primarily to the calculation for retail uses, which has the most intensive loading demand. For the regional retail uses within Candlestick Point, loading facilities would be located to meet multiple tenants within the retail development. Project impacts related to loading operations would be less than significant.

Table III.D-22 Summary of Project Loading Demand and Supply

Scenario/Project Area	*Daily Truck Generation*	*Peak Hour Loading Dock Space Demand*	*Supply[a, b]*
Hunters Point Shipyard	713	41	42
Candlestick Point	507	29	59
Total	***1,220***	***70***	***101***

SOURCE: LCW Consulting, 2009

a. Minimum number of loading spaces permitted per draft Design for Development standard for CP-HPS Phase II Development Plan.

b. Does not include stadium loading facilities.

Impact TR-38: Stadium 49ers Game Site Access and Traffic Impacts

Impact TR-38 **For as many as 12 times a year, 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. (Significant and Unavoidable with Mitigation) *[Criterion D.a]***

With the Project, the existing traffic management of pre-game and post-game traffic would be adjusted to reflect the new stadium location and access routes. The Project includes a new Traffic Management Center, to be staffed by City employees, to dynamically monitor and operate traffic signals along primary ingress and egress routes to efficiently move traffic into and out of the area prior to and after games. In addition, similar to existing conditions, traffic control officers would be stationed at key locations to ensure efficient traffic movements. The overall game day traffic control plan is shown in Figure III.D-13 (Stadium Game Day Traffic Control Plan).

Similar to existing conditions, the majority of stadium-bound traffic would use a portion of US-101 to access the Project site on game days. Traffic from the south would predominantly use northbound US-101 and access the site via Harney Way, while traffic from the north would predominantly use southbound US-101 and I-280 and access the site via Cesar Chavez Street, Cargo Way, Evans Avenue, and Innes Street. Some trips to the site would use Bayshore Boulevard or Third Street to access the area via Carroll Avenue, Gilman Avenue, and Ingalls Street.

Prior to and after games at the proposed stadium, special measures (similar to those in place for existing football games) would be taken to allow the site's circulation system to accommodate unique game day traffic flows. Figure III.D-14 (Stadium Game Day Ingress Routes) presents the pre-game circulation plan and Figure III.D-15 (Stadium Game Day Egress Routes) present the post-game circulation plan. Prior to games, the site's roadways would be geared towards inbound flow and after games the roadways would be geared towards outbound flow.

Vehicles accessing the new stadium from the south would use Harney Way. Harney Way would be configured to provide four inbound lanes (to the stadium) and one outbound lane between US-101 and Arelious Walker Drive. Arelious Walker Drive, between Harney Way and Crisp Avenue would provide four inbound lanes. Crisp Avenue would provide seven inbound lanes between Arelious Walker Drive and the new stadium. The lane configurations would be reversed for post-game conditions.

Vehicles accessing the new stadium from the south would be routed via the routes described above to Crisp Avenue, where they would be channeled to a Ring Road on the southern portion of the stadium. Access to the internal parking aisles would be from the Ring Road.

Vehicles accessing the new stadium from the north would use Evans Avenue and Cargo Way. These inbound routes would merge at the intersection of Hunters Point Boulevard/Jennings/Evans. From there, the inbound route along Hunters Point Boulevard and Innes Avenue would provide four inbound lanes and one outbound lane. The lane configurations along Hunters Point Boulevard and Innes Avenue would be reversed for post-game conditions.

SOURCE: Fehr & Peers, 2010.

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FIGURE III.D-13

Candlestick Point — Hunters Point Shipyard Phase II EIR

STADIUM GAME DAY TRAFFIC CONTROL PLAN

SOURCE: Fehr & Peers, 2010.

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FIGURE III.D-14

Candlestick Point — Hunters Point Shipyard Phase II EIR

STADIUM GAME DAY INGRESS ROUTES

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-15

Candlestick Point — Hunters Point Shipyard Phase II EIR

STADIUM GAME DAY EGRESS ROUTES

Under typical traffic conditions, traffic impacts are measured in terms of intersection levels of service. However, due to the unique circumstances following a football game, including manual and dynamic control of intersections by traffic control officers and complex travel patterns, traditional methods of calculating intersection levels of service are not be appropriate. Instead, for post-game conditions, traffic impacts associated with the new stadium are described in terms of the magnitude, duration, and expected locations of congestion.

The one-hour period immediately following the conclusion of a football game is generally the worst-case period. The amount of vehicular traffic associated with the new stadium is expected to be similar to, or even slightly less than, the amount of traffic associated with the existing stadium because of the improved transit service proposed to serve the new stadium. However, because under the Project conditions, there would be additional development around the stadium compared to the 2030 No Project conditions, the additional vehicle trips associated with the new stadium and increased surrounding development would somewhat increase congestion and delays following a football game from 2030 No Project conditions.

As shown on Table III.D-23 (Locations of Congestion Following San Francisco 49ers Football Game), the proposed location of the new stadium would create additional exit routes such that more streets would be congested following a game than under the 2030 No Project conditions. Providing additional egress routes would spread the post-game congestion, and provide a quicker parking lot clearance time. However, it would result in game day traffic congestion along Innes Avenue, Evans Avenue, and Cargo Way, which would not experience substantial congestion following a game under the 2030 No Project condition.

One result of providing additional egress routes from the proposed new stadium is that traffic congestion is expected to clear the area quicker. The projected clearance time for a sell-out game at the proposed stadium would be about one and a half hours, compared to almost three hours for the existing stadium under 2030 No Project conditions. The projected clearance time is based on the number of vehicles parked in the stadium parking lot, which would be less for the proposed stadium than for the existing stadium. Due to the multiple access routes serving the stadium, the number of roadways expected to experience post-game traffic congestion is expected to increase with the Project, however, as noted above the total duration of expected post-game congestion is expected to be considerably less than under the 2030 No Project condition.

Table III.D-23 Locations of Congestion Following San Francisco 49ers Football Game

Exit Route	*No Project (Existing Stadium)*	*Project (HPS Stadium)*
Harney Way, between Candlestick Park and US-101	X	X
Jamestown, Ingerson, Gilman, and Carroll Avenues, between Candlestick Park and Third Street	X	X
Paul Avenue, between Third Street and Bayshore Boulevard	X	X
Third Street, between Jamestown and Cesar Chavez Street	X	X
Innes Avenue/Hunters Point Boulevard, between Earl Street and Jennings Street		X
Jennings Street/Cargo Way/Illinois Street, between Evans Avenue and 25th Street		X
Evans Avenue, between Jennings Street and Cesar Chavez Street		X
Cesar Chavez Street, between US-101 and I-280		X

SOURCE: Fehr & Peers, June 2009

Analysis based on expected stadium exit routes. Other exit routes identified in Figure III.D-15, but not shown on this table are downstream of major bottlenecks and, although expected to carry additional post-game traffic, are not expected to function at capacity.

Similar to the roadway analysis, because the post-game traffic is expected to be spread out over a greater number of exit routes, more freeway interchanges are expected to handle larger numbers of game day traffic. Two freeway segments, I-280 southbound between the Alemany Street off- and on-ramps and US-101 northbound at the on-ramp from Bayshore Boulevard would actually see improvements, compared to the 2030 No Project conditions. This is because traffic from the proposed stadium location would use different routes to reach the freeway. The Project would impact the segment of I-280 northbound between 25th Street/Indiana Street and Mariposa Street.

The Project would result in new freeway facilities operating unacceptably. However, the duration of expected congestion would likely be less due to the higher level of transit use, the Transportation Management Center housed within the stadium to increase efficiency of exiting traffic, and the greater amount of identified post-game exit routes and freeway access points. Overall, since new facilities, including local streets and freeway facilities, would experience congested traffic following a football game, traffic impacts associated with the new stadium during game days would be significant.

The Project includes measures to reduce the magnitude of the traffic impacts associated with the new stadium, including limiting the parking supply, providing a more robust transit system, and locating the stadium so as to better disperse traffic following a game. As a result, the exit capacity of the new stadium would be greater than that of the existing stadium. Mitigation measures associated with additional roadway widening would have unwanted secondary impacts on pedestrian and bicycle conditions during non-game days, which represent the vast majority of the time, and were therefore not considered further. However, mitigation measure MM TR-38 is required to ensure that a management plan for accommodating the increased vehicle, transit, pedestrian and bicycle demands during game days is prepared and implemented.

MM TR-38 *Transportation Management Plan (TMP) for the stadium. The stadium operators shall develop and maintain a Transportation Management Plan (TMP) for the stadium. The stadium operator shall work with representatives from the SFMTA, the State Highway Patrol, the Police Department, private charter operators, Caltrain and others on a continuing basis to develop and refine the TMP, as determined appropriate by SFMTA. The final stadium TMP shall be approved by SFMTA. Preparation of the TMP shall be fully funded by the stadium operator, and shall be completed in time for implementation on opening day of the stadium.*

The following actions shall be included in the TMP:

- *Information on transportation options to the stadium, including game day service by the various regional service providers shall be distributed to season ticket holders, employees, and other patrons if possible.*
- *A brochure, information packet, and/or web page providing full information on transit access to the stadium, similar to that currently offered at the 49ers website, shall be updated and maintained.*
- *The use of charter buses to the stadium shall be encouraged and expanded. A number of measures shall be considered that could be implemented at low-cost to expand the use of group charters, including reduced parking costs, publicize the groups in 49ers publications and mailings, provide priority parking, provide lounges for bus drivers and provide support services for rooter clubs.*
- *Residential Permit Parking Program and/or additional parking restrictions, such as time limits, during game days, particularly in the Bayview Hunters Point areas, shall be explored with residents to reduce potential for intrusion of stadium vehicles into the adjacent neighborhood during a football game or secondary event.*
- *The stadium operator shall implement measures to encourage carpools of 4-plus persons per vehicle.*

- *The stadium operator shall charge a higher parking cost for low occupancy vehicles.*
- *The stadium operator shall develop a separate TDM plan for employees of the stadium and concessionaires. The plan shall consider measures such as providing employees and concessionaires with free or subsidized transit passes to encourage transit use and reduce vehicular travel to the stadium. Employees shall not receive preferential parking.*
- *The stadium operator shall develop measures with CPSRA to ensure that game day spectators do not park in CPSRA day use parking lots. Strategies to be explored include limiting parking in CPSRA lots to a limited duration during game days (e.g., to a two-hour period), or an increase in parking fees equivalent to game day parking, and ticketing and enforcement.*
- *The TMP shall ensure that regular transit routes operate acceptably near the stadium. The plan should consider providing alternate routes for those transit lines that do not have exclusive right-of-way on game days (48-Quintara-24th Street, 44-O'Shaughnessy, 29-Sunset) onto transit-only facilities such as the BRT right-of-way to the south and Palou Avenue to the north (which would be a transit-only facility on game days).*

Implementing this mitigation measure would likely reduce automobile travel to the stadium and encourage transit usage. However, even with implementation of mitigation measure MM TR-38, the Project's impacts on Sunday pre-game and post-game period traffic conditions would remain significant and unavoidable.

Impact TR-39: Stadium 49er Game Transit Impacts

Impact TR-39 **Implementation of the Project with existing game day service and Project transit improvements would not be adequate to accommodate projected transit demand. (Significant and Unavoidable with Mitigation) *[Criteria D.f, D.i]***

During game days, the regularly scheduled bus service adjacent to the stadium would continue to operate on normal routes, providing direct service to the stadium and into the Hunters Point Shipyard Transit Center. Special game day transit, including charter buses and public transit express service would access the stadium via Palou Avenue, which would be converted to transit-only on game days. These buses would conduct passenger loading and unloading on Crisp Avenue, in front of the stadium. The stadium parking program calls for 340 bus parking spaces to store empty buses during the game. Figure III.D-16 (Stadium Game Day Transit) illustrates the Project's game day transit service.

During sellout games, about 16,388 spectators and 652 game day employees are expected to use transit to access the stadium, a total of 17,040 transit riders. Assuming similar transit ridership from regional providers (including charter service expected to replace service previously provided by Golden Gate Transit, the Santa Clara Valley Transportation Authority, and SamTrans) and other private charters, the expected Muni ridership to the stadium would be 12,040 (an increase of about 5,500 patrons from existing conditions). This ridership includes transit patrons who use regional transit, such as Caltrain and BART, and transfer to Muni to access the stadium.

As presented in Table III.D-24 (Game Day Muni Capacity by Line), the combination of regularly scheduled transit service and game day express routes, similar to what is provided to the existing stadium, is expected to be approximately 8,400 passengers per hour. Therefore, with a projected Muni ridership of 12,040 patrons and capacity of 8,400 passengers per hour, there would be a capacity shortfall of approximately 3,640 passengers per hour. This shortfall in transit capacity would be considered significant.

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-16

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STADIUM GAME DAY TRANSIT

Table III.D-24 Game Day Muni Capacity by Line

Route	*One-Way Hourly Capacity (passengers per hour)*
24-Divisadero	400[a]
28L-19th Avenue/Geneva Avenue	800[a]
44-O'Shaughnessy	450[a]
48-Quintara	250[a]
Game Day Express Service (75X, 77X, 78X, 79X, 86, and 87)	6,500[b]
Total	***8,400***

SOURCE: SFMTA, Fehr & Peers, 2009

a. Assumes Sunday peak hour capacity is 75 percent of typical weekday peak hour capacity, per SFMTA TEP assumptions.
b. Based on existing ridership on these express routes

- *MM TR-39* *Transit Service during Game Days. SFMTA shall increase frequency on regularly scheduled Muni routes serving the stadium area on game days. In addition, the stadium operator shall fund additional Muni shuttle service between the stadium and regional transit service, including BART (Balboa Park and/or Glen Park Station) and Caltrain (Bayshore Station). Although the specific frequencies of individual routes should be determined based on patron characteristics that may evolve over time, the increased transit service, taken as an aggregate, should generally compensate for the projected shortfall of 3,600 passengers per hour on the existing and proposed transit lines.*

  Prior to opening day at the new stadium, the City and stadium operator shall determine costs associated with the increased service and determine funding sources. Examples of funding sources that shall be considered include a surcharge on game tickets or other such revenue mechanism. Implementation of increased transit service would be the responsibility of SFMTA and the stadium operator, and would be implemented when projected attendance warrants additional service.

With implementation of mitigation measure MM TR-39, the Project's impacts to transit service on Sundays during a football game could be reduced to less-than-significant levels. However, due to the traffic impacts during post-game conditions (see Impact TR-38 for discussion of traffic impacts) on transit operations, which could not be mitigated, the impact on transit operations would remain significant and unavoidable.

Impact TR-40: Stadium 49ers Game Bicycle Impact

Impact TR-40 **For as many of 12 times per year during game days, bicycle access in the vicinity of the proposed stadium would be constrained, however, accommodations for bicycle access and circulation would be provided. (Less than Significant) *[Criterion D.k]***

The Project would improve bicycle access to the area in terms of new bicycle lanes on existing and reconfigured roadways, and bicycle access within and in the vicinity of the Project site would be maintained on game days. However, bicycle access would be constrained due to the heavy traffic volumes at locations further away from the Project site where bicycle lanes are not provided. At these locations, bicyclists would likely divert to roadways not designated as stadium access routes (e.g., bicyclists may use Revere Avenue instead of Gilman Avenue for access to and from the stadium).

For those patrons arriving by bicycle, the proposed stadium would provide improved amenities compared to the existing stadium. Bicycle racks and lockers would be provided at the stadium entrances. In addition, a bicycle valet, similar to the service operated at AT&T Park for San Francisco Giants baseball games would be provided.

Bicycle access to the stadium on football game days would be difficult, as at present, due to heavy traffic volumes. However, bicycle access to the new stadium would be provided, and impacts on bicycle operations would therefore be less than significant.

Impact TR-41: Stadium 49ers Game Pedestrian Impacts

Impact TR-41 **For as many of 12 times per year during game days, pedestrian access in the vicinity of the proposed stadium would be constrained, however, accommodations for pedestrian access and circulation would be provided. (Less than Significant) *[Criterion D.j]***

Pedestrian access to the stadium from external locations would be provided via 15-foot sidewalks on either side of Crisp Avenue. All other streets leading into the stadium site would provide 12 to 15-foot-wide sidewalks. Near the stadium, game day pedestrians would be allowed to cross the Crisp Avenue at two locations where the Ring Road intersects Crisp Avenue. In addition, pedestrians traveling between the stadium and the 3,000 parking spaces in the Hunters Point Shipyard R&D campus would cross the Ring Road on the south side of Crisp Avenue. Because of the need to balance pedestrian flows with efficient auto egress, temporary pedestrian overcrossings, similar to the one recently installed across Hunters Point Expressway, would be provided. Traffic control officers would also be stationed at the overcrossings, as well as at other at-grade crossings.

Pedestrian travel throughout the Project site may be disrupted by game day traffic, and pedestrian travel near the new stadium, would experience crowding. However, this is expected and understandable for large events, and would be similar to conditions at the existing stadium.

Pedestrian access to the stadium during game days would be difficult, as at present, due to heavy traffic volumes. However, since pedestrian access would be maintained, stadium game day impacts on pedestrian circulation would be less than significant.

Impact TR-42: Stadium 49ers Game State Park Access Impacts

Impact TR-42 **For as many as 12 times per year during game days, access to state park facilities for vehicles, bicyclists and pedestrians would be constrained, and heavy traffic congestion could discourage use of the park. However, access for vehicles, bicyclists, and pedestrians would be maintained. (Less than Significant) *[Criteria D.j, D.k]***

With the Project, the Bay Trail around Yosemite Slough would be completed, and all existing connections to the Bay Trail would be maintained. Pedestrian and bicycle access to the developed state park lands would be maintained, and the Project's extensive improvements to the area bicycle and pedestrian network would facilitate access to the state parks lands. Pedestrian and bicycle access to state park lands on game days would be similar to existing condition; that is, heavy traffic congestion in the pre- and post-game periods could discourage bicycle use to and from CPSRA during these periods, generally during two hours before and after each game.

Because there would be at least one lane open to traffic in each direction during pre- and post-game operations on roadways providing access to CPSRA facilities, vehicle access to state parks would still be accommodated on game days. However, as with bicycle access, heavy traffic congestion during game days could discourage vehicular access to and from the state parks during these periods.

Overall, since vehicle, bicycle and pedestrian access to state park facilities would be maintained during game days, impacts related to access would be less than significant.

Impact TR-43: Stadium 49ers Game Parking Impacts

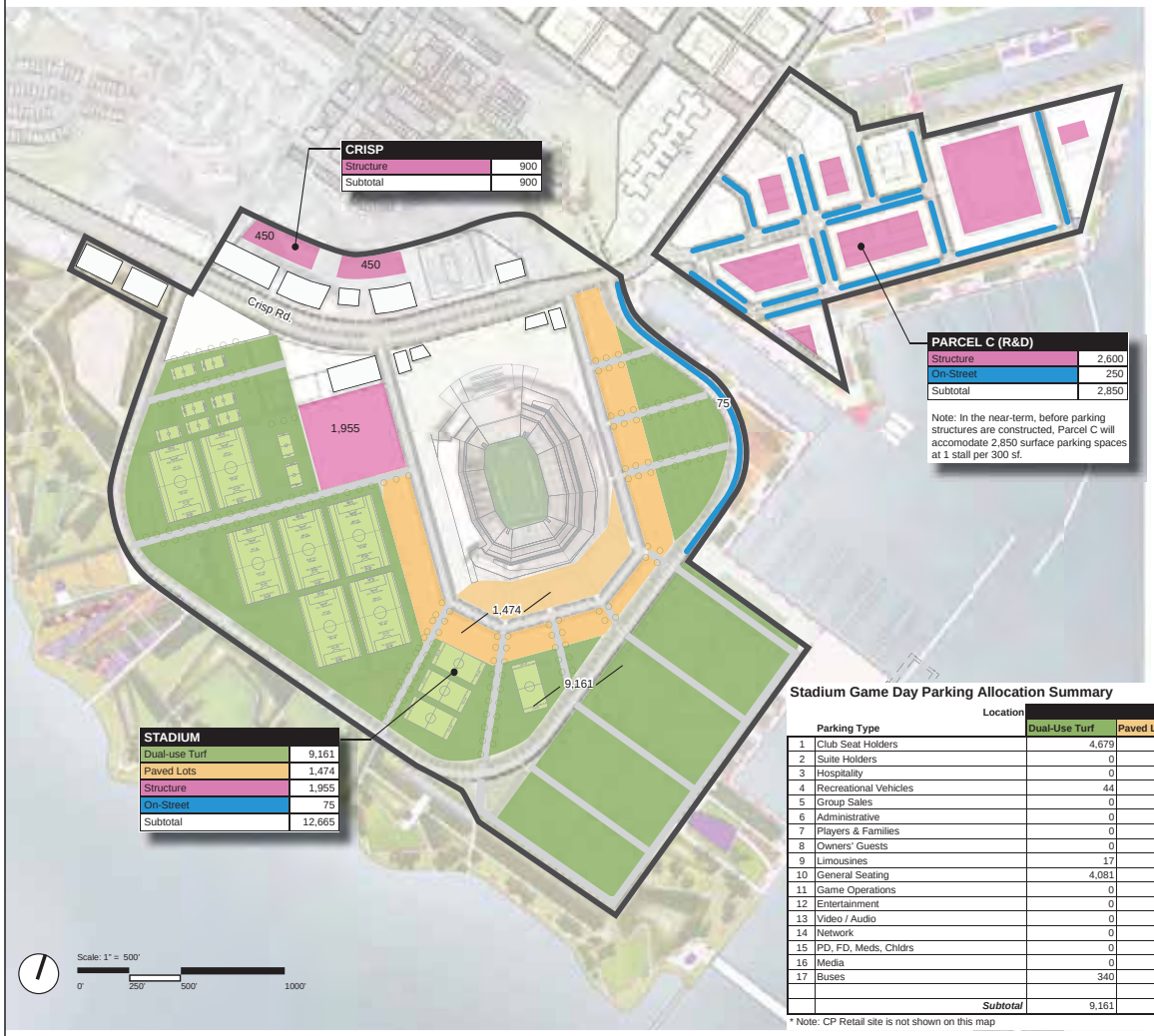
Impact TR-43 **For as many of 12 times per year during game days, parking demand associated with sell-out events would exceed the proposed on-site supply, resulting in a parking supply shortfall. The shortfall would be accommodated within other on-street and off-street parking facilities, and some patrons may elect to take transit to the stadium. (Less than Significant)** ***[Criteria D.e, D.h]***

The 49ers stadium area would have a total supply of 17,415 game day parking spaces, as presented on Figure III.D-17 (Proposed Stadium Game Day Parking). A total of 12,665 of the 17,415 parking spaces would be adjacent to the stadium, and accessible via a new loop road on the southern portion of the stadium. Of the 12,665 spaces, 340 spaces adjacent to the stadium would be reserved for buses, and the remaining 12,325 would be for private autos, RVs, limos, etc. Parking structures on the north side of Crisp Avenue, immediately across from the stadium, would accommodate an additional 750 vehicles, and would be accessible from Crisp Avenue. The R&D campus in Hunters Point Shipyard would provide an additional 3,000 spaces, of which 2,747 would be in structures and 253 would be on street.[126] These spaces would be accessible from internal roadways, which, in turn, would be accessible from Crisp Avenue. An additional 1,000 spaces would be provided in Candlestick Point retail parking structure that on game days would be reserved for stadium spectators.

A sell-out event at the stadium would result in a total game day travel demand of 20,134 vehicles (excluding buses) that would need to be accommodated. The Project would have a total game day parking supply of 17,415 spaces, of which 17,075 would be available for vehicle parking (340 spaces would be designated for buses). The 20,134-space parking demand would not be met within the 17,075-space parking supply, thus resulting in a shortfall of 3,059 spaces.

It is anticipated that the shortfall would be met similar to existing conditions, where spectators park in satellite parking lots, on street, or within private lots in the area. Currently about 4,300 parking spaces are available within satellite lots, and about 3,000 spaces on private lots that are generally restricted for use by residents, customers, and employees of private businesses. The likely result is that many patrons may elect to park in other off-site parking lots and either walk or take transit to the stadium. Some patrons may park within the CPSRA day use parking lots. Additionally, some patrons may also elect to take transit instead. Through effective parking management, including real-time information, public relations campaigns, and parking pricing strategies, the additional parking demand can be effectively managed.

[126] The on-street parking spaces in Area C would be made available for fixed-rate, longer-term parking by football patrons and controlled by City parking control officers on game days.



Stadium Game Day Parking Allocation Summary

	Location	STADIUM					CRISP	PARCEL C			CP RETAIL*	TOTAL
	Parking Type	Dual-Use Turf	Paved Lots	Structure	On-Street	Subtotal	Structures	Structures	On-Street	Subtotal	Structures	
1	Club Seat Holders	4,679	0	0	0	4,679	0	0	0	0	0	4,679
2	Suite Holders	0	0	1,202	0	1,202	0	0	0	0	0	1,202
3	Hospitality	0	44	0	0	44	0	0	0	0	0	44
4	Recreational Vehicles	44	0	0	0	44	0	0	0	0	0	44
5	Group Sales	0	0	20	0	20	0	0	0	0	0	20
6	Administrative	0	0	25	0	25	0	0	0	0	0	25
7	Players & Families	0	220	0	0	220	0	0	0	0	0	220
8	Owners' Guests	0	60	0	0	60	0	0	0	0	0	60
9	Limousines	17	0	0	0	17	0	0	0	0	0	17
10	General Seating	4,081	680	483	75	5,319	900	2,600	250	2,850	1,000	10,069
11	Game Operations	0	0	225	0	225	0	0	0	0	0	225
12	Entertainment	0	30	0	0	30	0	0	0	0	0	30
13	Video / Audio	0	30	0	0	30	0	0	0	0	0	30
14	Network	0	60	0	0	60	0	0	0	0	0	60
15	PD, FD, Meds, Chldrs	0	200	0	0	200	0	0	0	0	0	200
16	Media	0	150	0	0	150	0	0	0	0	0	150
17	Buses	340	0	0	0	340	0	0	0	0	0	340
	Subtotal	9,161	1,474	1,955	75	12,665	900	2,600	250	2,850	1,000	**17,415**

* Note: CP Retail site is not shown on this map

SOURCE: Fehr & Peers, 2009.

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FIGURE III.D-17

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED STADIUM GAME DAY PARKING

The satellite parking lots identified in the parking supply are privately owned and operated and are not under the control of the stadium operator. Some of the satellite and private lots may not be available in the future due to development of other uses on that land (e.g., Executive Park development project). Development of the satellite and private lots would likely occur gradually so that the parking deficit would increase incrementally over time. Without the use of satellite lots, and without the provision of additional parking on-site (such as in a garage) or off-site (on adjacent properties such as Brisbane Baylands), stadium spectators would park on street further from the stadium (such as in the Bayview), or switch to alternative modes of transportation such as transit or charter buses.

As noted above, during game days, 1,000 parking spaces in the Candlestick Point retail parking structure would be reserved for stadium spectators, and as a result fewer spaces would be available for Candlestick Point retail patrons. In general, peak parking demand for shopping centers is lower on Sundays than on Saturdays or weekdays, and it is expected that during game days retail patrons would adjust their shopping trip to outside of the game day period, find short-term parking on-street, or access the shopping center via transit. During December when parking demand at shopping centers increases due to holiday shopping, the number of retail patrons that would be affected would increase. However, these patrons could be accommodated within the transit service provided pre- and post-game days.

Since stadium game day parking demand would be accommodated within the proposed parking facilities, privately owned satellite parking lots, and on street, and since alternative modes of transportation such as transit and charter buses would be available for spectators, stadium game day impacts on parking would be less than significant.

Impact TR-44: Stadium 49ers Game Loading Impacts

Impact TR-44 **Implementation of the Project would result in stadium game day loading demand that would be accommodated within the proposed on-site supply. (Less than Significant) *[Criterion D.1]***

The preliminary design for the new stadium includes loading dock accommodating four semi-trailer trucks and an adjacent TV staging and loading area. The TV staging and loading area would be used for loading/unloading on the days leading up to a game. Separate trash and recycling areas would be provided. The loading facilities for the stadium would be designed based on experience at the existing stadium, and for the needs for large special events such as Monday Night Football games or the Super Bowl.

A total of 100 delivery trucks are expected to serve the stadium in the week prior to a game. The majority of these trucks would serve the concession and food service functions. Stadium-bound delivery trucks would make their deliveries in advance of events to avoid peak travel periods that occur in the hours leading up to a game. Vendors would be notified by the stadium operator of appropriate delivery times.

Based on information obtained from the 49ers for the existing stadium, for a Sunday afternoon game, truck deliveries would occur in the middle of the week, with about 10 percent occurring on Wednesday, 40 percent on Thursday, and 50 percent on Friday. This truck traffic would be spread over the entire day. The peak stadium delivery day would be Friday, when approximately 50 trucks would make deliveries to the stadium. As is currently done, television trucks would arrive in advance of events to allow for appropriate set-up time and to avoid peak travel periods.

The proposed stadium loading facilities would be sufficient to accommodate projected demand, and therefore impacts related to loading would be less than significant.

Impact TR-45: Stadium 49ers Game Emergency Vehicle Access

Impact TR-45 **During game days, accommodation for emergency access would be provided. (Less than Significant) *[Criterion D.m]***

During game days, two-way inbound and outbound vehicular circulation would be provided at all times, via three primary routes. On the Harney Way/Arelious Walker Drive route, emergency vehicles would be allowed to use the BRT-only lanes (the BRT-only lanes break off from the primary auto route and continue on Harney Way, east of Arelious Walker Drive, and on Egbert Street before reconnecting with Arelious Walker Drive immediately south of the Yosemite Slough bridge). Emergency vehicles would also be allowed to use Palou Avenue, which would be transit-only on game days. Both of these routes would be free of congestion, and would offer emergency vehicle access between regional facilities and Crisp Avenue. Emergency vehicles would be able to enter the stadium parking lot via Crisp Avenue. Emergency vehicles would also be able to use Innes Avenue, as there would be at least one lane in each direction on this route open to traffic. However, since immediately following games the outbound direction may be congested, this may not be a desirable route as the Harney Way BRT lanes or Palou Avenue.

Since multiple emergency access routes would be provided, stadium game day impacts on emergency access would be less than significant.

Impact TR-46: Stadium Secondary Event Site Access and Traffic Impacts

Impact TR-46 **Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. (Significant and Unavoidable with Mitigation) *[Criteria D.a, D.b, D.g]***

The impact analysis of a secondary event at the new stadium assumed a weekday evening event with an attendance of 37,500 spectators. Secondary events could occur at any time of the day, and on any day of the week. Secondary events at the stadium would be limited to 20 total occurrences per year.

After exiting regional freeways, traffic generated by a secondary event would access the site via Cesar Chavez Street, Cargo Way, Evans Avenue, Innes Avenue, Bayshore Boulevard, Third Street, Carroll Avenue, Gilman Avenue, and Ingalls Street. The number of vehicles on the roadways accessing the stadium would vary by route and the size of the event.

During a weekday evening secondary event, it is projected that approximately one half of vehicle trips generated by a secondary event, or 4,688 vehicles would arrive approximately one hour prior to an event start time, likely between 5:00 and 6:00 p.m., coinciding with the weekday evening peak hour. Project vehicle trips would be added to the following freeway facilities that would operate at LOS E or LOS F during the weekday PM peak hour:

- US-101 northbound from Harney Way to Third/Bayshore

- US-101 northbound from Sierra Point Parkway to Harney Way
- US-101 southbound from Mariposa Street to Cesar Chavez
- US-101 southbound off-ramp to Harney Way
- I-280 southbound off-ramp to Pennsylvania/25th

In addition, the secondary event would cause an additional off-ramp to operate at LOS F conditions:

- US-101 southbound off-ramp to Bayshore/Cesar

Table III.D-25 (Intersection Level of Service Project and Secondary Event—Weekday PM Peak Hour—2030 Conditions) compares the intersection LOS operating conditions for the Project weekday PM peak hour conditions without a secondary event to conditions with a secondary event. The table includes only the intersections along the access routes that would be primarily affected by secondary event traffic. Although other study intersections may experience traffic increases immediately preceding and following an event, the increase is not expected to be substantial since those locations would not be on primary routes between regional transportation facilities and the stadium.

With a secondary event, an additional 9 intersections would operate at LOS E or LOS F conditions, beyond those identified for the PM peak hour under Project conditions, including:

- Harney/Jamestown
- Crisp/Palou
- Ingalls/Thomas
- Ingalls/Carroll
- Arelious Walker/Gilman
- Amador/Cargo
- Innes/Arelious Walker
- Evans/Jennings
- Harney/Executive Park East
- Harney/Thomas Mellon

Additionally, traffic associated with a secondary event would exacerbate traffic operations at 11 intersections that would operate at LOS E or LOS F conditions without a secondary event in the PM peak hour, including:

- Third/25th
- Third/Evans
- Third/Carroll
- Third/Paul
- Third/Jamestown
- Cesar Chavez/Evans
- Alana Way/Beatty
- Alana Way/Harney/Mellon
- Amador/Cargo Way
- Innes/Arelious Walker
- Evans/Napoleon/Toland

Table III.D-25 Intersection Level of Service Project and Secondary Event—Weekday PM Peak Hour—2030 Conditions

		Project No Event		*Project with Secondary Event*	
	Intersection	*Delay[a]*	*LOS[b]*	*Delay*	*LOS*
1	Third St/25th St	>80	F	>80	F
2	Third St/Cesar Chavez	>80	F	>80	F
4	Third St/Evans Ave	>80	F	>80	F
8	Third St/Carroll Ave	75	E	74	E
9	Third St/Paul Ave	>80	F	>80	F
10	Third St/Ingerson Ave	43	D	39	D
11	Third St/Jamestown Ave	>80	F	>80	F
12	Third/Le Conte/US-101 nb off	23	C	28	C
14	25th St/Pennsylvania Ave	40	D	45	D
16	Cesar Chavez St/Evans Ave	>80	F	>80	F
17	Cesar Chavez St/Illinois St	23	C	40	D
27	Alana Way/Beatty Ave[c]	>80	F	>80	F
28	Alana Way/Harney Way/Mellon[c]	>80	F	>80	F
29	Harney Way/Jamestown Ave[d]	41	D	>80	F
30	Crisp Ave/Palou Ave[d]	54	D	>80	F
31	Ingalls St/Thomas Ave[d]	33	C	>80	F
32	Ingalls St/Carroll Ave[d]	38	D	>80	F
34	Arelious Walker/Gilman Ave[d]	36	D	>80	F
35	Amador St/Cargo Way	59	E	>80	F
46	Innes Ave/Arelious Walker Drive[d]	6	A	67	E
47	Innes Ave/Earl St	19.4(sb)	C	22.4(sb)	C
48	Evans Ave/Jennings St	31	C	>80	F
58	Evans/Napoleon/Toland	>80	F	>80	F
59	Harney Way/Executive Park East	26	C	>80	F
60	Harney Way/Thomas Mellon	26	C	>80	F

SOURCE: Fehr & Peers
a. Delay in seconds per vehicle.
b. Intersections operating at LOS E or LOS F conditions highlighted in bold.
c. Year 2030 analysis includes signalization as part of Executive Park Development or new Harney Interchange.
d. Year 2030 analysis includes signalization as part of Project.

Overall, since new facilities, including local streets and freeway facilities, would experience congested traffic following prior to a secondary event, traffic impacts associated with the new stadium during secondary events would be significant.

- *MM TR-46* *Traffic Control Officers. The stadium operator shall develop as part of a stadium Transportation Management Plan (TMP), a strategy for coordinating with representatives of SFMTA and the SF Police Department for deploying traffic control officers in the Project vicinity to increase efficiency of pre-*

and post- event traffic, similar to what would be in place for football game days. The secondary event component of the stadium TMP shall be approved by SFMTA. The stadium operator shall fully fund implementation of the secondary event (i.e., non-49ers football events) measures.

Implementation of this mitigation measure would likely improve vehicle entrance and exit flows to the stadium site, maintain orderly traffic operations, and reduce intrusion onto neighborhood streets near the stadium. However, even with the implementation of mitigation measure MM TR-46, on days when special events are held at the stadium, the Project's impacts to the study roadway network would be significant and unavoidable.

Impact TR-47: Stadium Secondary Event Transit Impacts

Impact TR-47 **With implementation of the Project, the existing transit service and Project improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event. (Significant and Unavoidable with Mitigation) *[Criteria D.f, D.i]***

During secondary events, regularly scheduled bus service adjacent to the stadium would continue to operate, providing direct service to the stadium and into the Hunters Point Shipyard Transit Center. Additional secondary event-related transit service is not proposed. Table III.D-26 (Weekday PM Peak Hour One-Way Muni Capacity to Stadium by Line Weekday PM Conditions) presents the total one-way capacity that would be available during the weekday PM peak hour.

Table III.D-26 Weekday PM Peak Hour One-Way Muni Capacity to Stadium by Line Weekday PM Conditions

Route	*Peak Hour Frequency (minutes)*	*One-Way Hourly Capacity (passengers per hour)*
24-Divisadero	6	635
28L-19th Avenue/Geneva Avenue	5	1,130
44-O'Shaughnessy	6	635
48-Quintara	10	380
HPX—Hunters Point Express	12	320
Total		***3,100***

SOURCE: SFMTA, Fehr & Peers

During the weekday evening period, up to 4,688 additional transit riders would be generated by a secondary event during the peak hour prior to the event. These would be in addition to the 1,037 transit trips inbound to the study area in the PM peak hour on routes serving the stadium area (e.g., 24-Divisadero, 28L-19th Avenue Limited, 44-O'Shaughnessey, 48-Quintara-24th Street, and HPX as extended to serve the event). Therefore, the overall one-way transit demand in the PM peak hour on days when a special event is being held at the stadium could be up to 5,725 riders. As shown in Table III.D-26, the total one-way transit capacity serving the stadium site during a typical weekday PM peak hour would be 3,100 passengers per hour, which would result 2,625 riders that would not be accommodated. This would be considered a significant impact.

- *MM TR-47* *Transit Service during Secondary Events. SFMTA shall increase frequency on regularly scheduled Muni routes serving the stadium area prior to large special events. In addition, the stadium operator shall fund additional Muni shuttle service between the stadium and regional transit service, including BART (Balboa Park and/or Glen Park stations) and Caltrain (Bayshore station).*

  - *Routes 24-Divisadero, 28L-19th Avenue Limited, and 44-O'Shaughnessey would already be operating near their maximum frequency. Therefore, this mitigation measure primarily applies to the 48-Quintara-24th Street route and the new HPX service. If each of these routes were increased to have five-minute frequencies (typically considered the maximum frequency that can be regularly maintained), the transit capacity toward the stadium would increase by 828 passengers per hour, for a total of 3,928 passengers. Even with the additional service on these two lines, there would be a shortfall of 1,797 passengers per hour in transit capacity.*
  - *Additional express service to key regional transit destinations and regional charter express service, similar to what is offered on football game days, would offset a portion of the shortfall in transit capacity. The amount and nature of special service to special stadium events would depend on the type and size of the special event. Generally, the capacity of the express service should compensate for the shortfall of 1,797 passengers per hour for a 37,500-person event (transit supply, would of course, be designed on a case-by-case basis depending on the expected size of the secondary event).*
  - *SFMTA and the stadium operator shall implement a stadium transportation systems plan similar to that developed for game-day operations (except that the Yosemite Slough bridge shall not be available for private automobiles), on a case-by-case basis depending on the expected size of the secondary event.*

  Prior to opening day at the new stadium, the City and the stadium operator shall determine costs associated with the increased service and determine funding requirements. Examples of funding sources that shall be considered include a surcharge on game tickets, parking or admission surcharge, or other such revenue mechanism. Implementation of increased transit service would be the responsibility of SFMTA and the stadium operator, and would be implemented when projected attendance warrants additional service.

With implementation of Project mitigation measure MM TR-47, the Project's impacts to transit service on special event days would be reduced, but not to less-than-significant levels. In addition, traffic impacts during secondary events would not be mitigated, and would impact transit operations. Therefore, the impact on transit operations would remain significant and unavoidable.

Impact TR-48: Stadium Secondary Event Bicycle Impacts

Impact TR-48 **With implementation of the Project, bicycle circulation would not be impeded during secondary events at the stadium. (Less than Significant)** ***[Criterion D.k]***

During secondary events, bicyclists would have access to the proposed bicycle facilities on existing and reconfigured roadways, as it is not anticipated that any special roadway network restrictions would be required to accommodate secondary event traffic. Bicycle access would be maintained on all study area roadways.

For those patrons arriving to the stadium by bicycle, the stadium would include bicycle racks and lockers would be provided at the stadium entrances. In addition, a bicycle valet, similar to the service operated at AT&T Park for the San Francisco Giants would also be provided. Overall, while traffic volumes on area roadways would increase during secondary events, the increase would not be sufficient to substantially affect bicycle circulation, and impacts on bicycle operations would therefore be less than significant.

Impact TR-49: Stadium Secondary Event Pedestrian Impacts

- **Impact TR-49** **With implementation of the Project, pedestrian circulation would not be impeded during secondary events at the stadium. (Less than Significant)** ***[Criterion D.j]***

The proposed street and sidewalk network in the vicinity of the stadium is designed to accommodate sell-out football game day crowds accessing and leaving the stadium site. Pedestrian access to the stadium during secondary events would be accommodated within the existing and proposed sidewalk network, although due to large number of pedestrians and vehicles accessing the stadium, pedestrians may experience crowding. However, this is expected and would be managed during large events as part of the stadium operations. Therefore, secondary event impacts on pedestrian circulation would be less than significant.

Impact TR-50: Stadium Secondary Event Parking Impacts

Impact TR-50 **With implementation of the Project, parking demand associated with a secondary event with an attendance of 37,500 spectators would be accommodated within the proposed supply. (Less than Significant)** ***[Criterion D.h]***

The parking supply associated with secondary events would vary, depending on the size of the event. For a secondary event with 37,500 spectators, it is anticipated that the stadium parking supply of 12,665 spaces would be made available. These include the dual-use fields, paved lot, structured parking facilities, and on-street parking.

A stadium secondary event with 37,500 spectators is expected to generate up to 10,100 vehicles, or about one half that of a sell-out football game day. These vehicles would be accommodated within the stadium parking supply. Impacts of stadium secondary events on parking would be less than significant.

Impact TR-51: Project Site Access and Traffic Impacts from Arena uses

Impact TR-51 **With implementation of the Project, weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Project conditions without an arena event. (Significant and Unavoidable with Mitigation)** ***[Criteria D.a, D.b, D.g]***

The impact analysis of arena events assumed a weekday evening sell-out event at the 10,000-seat arena. Although no specific program has been developed for events at the arena, sell-out events with 10,000 attendees occurring during weekday evenings would likely be infrequent. Smaller-sized events during the weekday evening, and events occurring during the day and on weekends would have fewer impacts due to the lower traffic volumes demands on the study area roadways.

Access to the arena would be via the existing roadway network—US-101, Harney Way, Gilman Avenue, and Third Street—as well as local streets within Candlestick Point. The number of vehicles would vary by route and the size of the event.

During a weekday evening event, it is projected that approximately one half of vehicle trips generated by a sell-out arena event, or 1,333 vehicles, would arrive approximately one hour prior to an event beginning, likely between 5:00 and 6:00 p.m. and therefore would coincide with the weekday evening peak hour. Project vehicle trips would be added to freeway facilities that would operate at LOS E or LOS F during the weekday PM peak hour for Project conditions:

- US-101 northbound from Harney Way to Third/Bayshore
- US-101 northbound from Sierra Point to Harney Way
- US-101 southbound from Mariposa Street to Cesar Chavez
- US-101 southbound off-ramp to Harney Way

Table III.D-27 (Intersection Level of Service Project No Event and Arena Event—Weekday PM Peak Hour—2030 Conditions) presents a comparison of intersection LOS operating conditions for the Project weekday PM peak hour conditions without a sell-out event to conditions with a sell-out event at the arena. Only the intersections along the access routes that would be primarily affected by arena traffic are listed.

During the weekday PM peak hour, the LOS at the intersection of Harney/Jamestown would change from LOS D under Project conditions without an event to LOS F conditions for Project conditions with an event. This would be a significant impact.

Additionally, traffic associated with a sell-out arena event would exacerbate traffic operations at 11 intersections that would operate at LOS E or LOS F conditions under Project conditions without an event, including:

- Third/25th
- Third/Cesar Chavez
- Third/Evans
- Third/Oakdale
- Third/Revere
- Third/Carroll
- Third/Jamestown
- Alana Way/Beatty
- Alana Way/Harney/Mellon
- Third/Williams/Van Dyke
- Third/Jerrold

Overall, since local streets and freeway facilities would experience increased congested prior to an arena event, traffic impacts associated with the new arena would be significant.

Table III.D-27 Intersection Level of Service Project No Event and Arena Event—Weekday PM Peak Hour—2030 Conditions

		Project No Event		*Project with Arena Event*	
	Intersection	*Delay[a]*	*LOS[b]*	*Delay*	*LOS*
1	Third St/25th St	>80	F	>80	F
2	Third St/Cesar Chavez	>80	F	>80	F
3	Third St/Cargo Way	>80	F	>80	F
4	Third St/Evans Ave	>80	F	>80	F
5	Third St/Oakdale Ave	60	E	60	E
6	Third St/Palou Ave	>80	F	>80	F
7	Third St/Revere Ave	>80	F	>80	F
8	Third St/Carroll Ave	75	E	74	E
9	Third St/Paul Ave	>80	F	>80	F
10	Third St/Ingerson Ave	43	D	41	D
11	Third St/Jamestown Ave	>80	F	>80	F
12	Third/Le Conte/US-101 nb off	23	C	24	C
19	Bayshore Blvd/Paul Ave	>80	F	>80	F
27	Alana Way/Beatty Ave[c]	>80	F	>80	F
28	Alana Way/Harney Way/Mellon[c]	>80	F	>80	F
29	Harney Way/Jamestown Ave[d]	41	D	>80	F
34	Arelious Walker/Gilman Ave[d]	36	D	37	D
56	Third/Williams/Van Dyke	>80	F	>80	F
57	Third St/Jerrold Ave	>80	F	>80	F
59	Harney Way/Executive Park East	26	C	30	C
60	Harney Way/Thomas Mellon	26	C	42	D

SOURCE: Fehr & Peers

a. Delay in seconds per vehicle.
b. Intersections operating at LOS E or LOS F conditions highlighted in bold.
c. Year 2030 analysis includes signalization as part of Executive Park Development or new Harney Interchange.
d. Year 2030 analysis includes signalization as part of Project.

MM TR-51 *Transportation Management Plan (TMP). The arena operator shall develop a Transportation Management Plan (TMP) for coordinating with representatives of SFMTA and the SF Police Department for deploying traffic control officers in the Project vicinity to increase efficiency of pre- and post- event traffic, and for developing incentives to increase transit ridership to the arena. If Variants 1, 2, or 2A are implemented the TMP shall provide for SFMTA to increase the frequency on regularly scheduled Muni routes (primarily the CPX-Candlestick Express) serving the arena area prior to large events at the arena and for the arena operator to provide additional shuttle service to key regional transit destinations, such as BART, Caltrain, and the T-Third light-rail route. Implementation of this mitigation measure would likely speed vehicle entrance and exit to the arena site as well as maintain orderly traffic and transit operations and reduce intrusion onto minor routes to and from the arena. Traffic control officers would facilitate traffic flow at the intersection of Harney/Jamestown which would operate at LOS F conditions with a sell-out arena event. The final arena TMP shall be approved by*

SFMTA. Preparation of the TMP Plan shall be fully funded by the arena operator, and shall be completed in time for implementation on opening day of the arena.

However, even with the implementation of MM TR-51, the Project's impacts to the study roadway network during a sell-out event at the arena would be significant and unavoidable.

Impact TR-52: Transit Impacts from Arena uses

- **Impact TR-52** **With implementation of the Project, sell-out weekday evening events at the arena could impact existing and proposed transit service. (Significant and Unavoidable with Mitigation) *[Criteria D.f, D.i]***

Arena events would be served by the existing and proposed transit routes serving Candlestick Point. Additional transit service is not planned as part of special events at the arena. Table III.D-28 (Weekday PM Peak Hour One-Way Muni Capacity to Arena by Line) presents the total one-way capacity that would be available during the weekday PM peak.

Table III.D-28 Weekday PM Peak Hour One-Way Muni Capacity to Arena by Line

Route	*Peak Hour Frequency (minutes)*	*One-Way Hourly Capacity (passengers per hour)*
29-Sunset	5	768
28L-19th Avenue/Geneva Avenue	5	1,130
CPX—Candlestick Point Express	10	380
Total		***2,278***

SOURCE: SFMTA, Fehr & Peers

During the weekday evening period, up to 1,000 transit riders would be generated in the peak hour prior to an event. These would be added to the 1,023 transit trips inbound to the study area during the PM peak hour on routes serving the arena (e.g., 29-Sunset, 28L-19th Avenue Limited, and the proposed CPX service). Therefore, the overall one-way transit demand in the PM peak hour on days when an event is being held at the arena could be up to 2,023. As shown in Table III.D-28, the total one-way transit capacity serving the arena during a typical weekday PM peak hour would be 2,278 passengers per hour, which would be adequate to serve the arena event and background demand generated by the Project land uses.

As described in Impact TR-51 above, traffic associated with a sell-out event at the arena would add to already congested conditions on the study area roadway network, and these conditions could not be mitigated to less-than-significant levels. Therefore, traffic impacts would impact transit service accessing the Project site. Providing transit-priority treatments on Gilman Avenue, as described in MM TR-23.1 would reduce travel time impacts on the 29-Sunset (the 28L-19th Avenue/Geneva Avenue and the CPX would be traveling with the proposed transit-only lanes and would not be subject to increased traffic congestion).

The impact of traffic congestion on transit service could be avoided with implementation of mitigation measure MM TR-23.1 identified above. Implementation of this mitigation measure would reduce impacts on transit operations to less-than-significant. However, due to the uncertainty of this mitigation, the impact would remain significant and unavoidable.

Impact TR-53: Bicycle Impacts from Arena uses

Impact TR-53 **With implementation of the Project, bicycle circulation would not be impeded during arena events. (Less than Significant) *[Criterion D.k]***

During arena events, bicyclists would have access to the proposed bicycle facilities on existing and reconfigured roadways, as it is not anticipated that any special roadway network restrictions would be required to accommodate arena event traffic. Bicycle conditions would be similar to those described in Impact TR-29.

For those patrons arriving to the arena by bicycle, the arena would include bicycle racks and lockers would be provided at the stadium entrances. Overall, while traffic volumes on area roadways would increase during arena events, the increase would not be sufficient to affect bicycle circulation, and impacts on bicycle operations would therefore be less than significant.

Impact TR-54: Pedestrian Impacts from Arena uses

Impact TR-54 **With implementation of the Project, pedestrian circulation would not be impeded during arena events. (Less than Significant) *[Criterion D.j]***

In the vicinity of the arena, 12- to 15-foot-wide sidewalks would be provided. In addition, the arena would be set back from the street to provide a pedestrian plaza area for gathering pedestrians. Pedestrian access to the arena events would be accommodated within the proposed sidewalk network, although due to large number of pedestrians and vehicles accessing the arena during a sell-out event, pedestrians may experience crowding. However, this is expected and would be managed during large events by the arena operator. Therefore, arena event impacts on pedestrian circulation would be less than significant.

Impact TR-55: Parking Impacts from Arena uses

Impact TR-55 **With implementation of the Project, arena parking demand would be accommodated on street and within proposed off-street parking facilities. (Less than Significant) *[Criteria D.e, D.h]***

No separate parking facilities would be provided for arena patrons. Visitors would utilize proposed public off-street and on-street parking spaces in the vicinity of the proposed arena. A sell-out arena event would generate a demand for 2,860 vehicles (including patrons and employees), which would be accommodated within the approximately 2,300 parking spaces within structured parking in Candlestick Point, and within the approximately 1,000 on-street parking spaces in the Candlestick Point North, South and Central areas (refer to Figure III.D-12).

During the weekday evenings, parking demand associated with the commercial uses in Candlestick Point that would utilize the public parking garage would be less than during the day, and spaces would be available for arena events. There would generally be a shortfall in parking supply, compared to Project parking demand, and therefore depending on the time of day of the arena event, surplus capacity may not be available to accommodate the arena parking demand. Arena events during peak periods of commercial activity would increase the shortfall in parking spaces. It is possible that some drivers may seek available parking in the available Bayview area, or others may shift to transit. As discussed in Impact TR-35, the secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to

some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Project impacts on parking would be less than significant.

Impact TR-56: Air Traffic Impacts

Impact TR-56 **Implementation of the Project would not impact air traffic. (No Impact) *[Criterion D.c]***

The Project site is not near an airfield; San Francisco International Airport is about seven miles to the south. This distance is outside of the limit for objects near airports in the guidance published by the Federal Aviation Administration (FAA) (within 20,000 feet or less than 4 miles from an airport). The FAA requires notice of construction for any structures within 20,000 feet what would extend 200 feet above ground level.[127] The proposed height of the tallest buildings (420 feet) would be approximately 30 feet higher than the crest of the adjacent Bayview Hill (which reaches an elevation of about 390 feet). The Project applicant will notify FAA prior to construction of buildings exceeding 200 feet to ensure compliance with FAA requirements. For those reasons, the heights of the Project buildings would not interfere with or result in any changes to air traffic. Therefore, Project impacts on air traffic safety would be less than significant.

Impact TR-57: Hazards due to Design Features

Impact TR-57 **Implementation of the Project would not create hazards due to any proposed design features. (Less than Significant) *[Criterion D.d]***

The Project includes construction of new roadways within the Project site, the construction of the Yosemite Slough bridge, and streetscape and intersection improvements outside of the Project site. New and reconfigured roadways would be designed in accordance with City standards, and would need to be reviewed and approved by the City prior to construction. Therefore, Project impacts related to hazards would be less than significant.

Impact TR-58: Emergency Access

Impact TR-58 **Implementation of the Project would not result in significant emergency access impacts. (Less than Significant) *[Criterion D.m]***

The Project includes the construction of new roadways to facilitate emergency access. Existing emergency response routes would either be maintained in their existing locations or rerouted as necessary. Further, all development would be designed in accordance with City standards, which include provisions that address emergency access (e.g., minimum street widths, minimum turning radii). In addition, emergency vehicles would be able to utilize transit lanes when streets are congested. Therefore, Project impacts on emergency access would be less than significant.

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[127] Federal Aviation Administration, Advisory Circular AC 70/7460-2K, Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace, March 1, 2000, available at http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/22990146db0931f186256c2a00721867/$FILE/ac70-7460-2K.pdf, accessed October 28, 2008.

Cumulative Impacts

The geographic context for the analysis of cumulative transportation impacts is the study area, as shown in Figure III.D-1, which, as explained above, includes all aspects of the transportation network that may be measurably affected by the Project. While cumulative impacts associated with the Project have been discussed above, together with Project-specific impacts, they are restated here for ease of reference. Several of the Project's transportation impacts would also make significant contributions to cumulative impacts in the study area.[128]

The Project would make significant contributions to the following cumulative traffic impacts: construction-related transportation impacts (Impact TR-1); traffic congestion (Impact TR-2); intersection traffic impacts at several intersections (Impact TR-3, Impact TR-4, Impact TR-5, Impact TR-6, Impact TR-7 and Impact TR-8); traffic impacts at several freeway mainline segments, weaving segments, ramps, and freeway diverge queue storage (Impact TR-11, Impact TR-13, Impact TR-15); and traffic spillover to adjacent neighborhoods (Impact TR-10). In addition, the Project would contribute to cumulative traffic volumes on Harney Way (Impact TR-16). Mitigation measures have been identified for many of these cumulative traffic impacts. Specifically, mitigation measures have been identified for Impact TR-1, Impact TR-2, Impact TR-4, Impact TR-6, Impact TR-7, Impact TR-8, Impact TR-10, Impact TR-15, and Impact TR-16. Most of these mitigation measures, however, are either uncertain at this time, or would be effective only to reduce, but not to completely avoid, these cumulative traffic impacts. Of these mitigation measures, and MM TR-16, related to the widening of Harney Way, would be effective to reduce Project-related contributions to cumulative traffic impacts on Harney Way to a less-than-significant level. Other mitigation measures that would be implemented and would reduce but not avoid significant effects are MM TR-1 [Construction Traffic Management Plan] to reduce construction traffic effects, MM TR-2 [Transportation Demand Management Plan] to reduce the Project's overall contribution to traffic, and MM TR-4 to reduce impacts at the intersection of Tunnel/Blanken. Implementation of MM TR-6 [Harney/US-101 Interchange], MM TR-7 [Amador/Cargo/Illinois], and MM TR-8 [Geneva/Bayshore] remains uncertain. Thus, cumulative traffic impacts associated with Impact TR-1, Impact TR-2, Impact TR-4, Impact TR-6, Impact TR-7, Impact TR-8, Impact TR-10 and Impact TR-15 for which mitigation measures have been identified would remain significant and unavoidable with mitigation. On the other hand, for cumulative traffic Impact TR-3, Impact TR-5, Impact TR-11, and Impact TR-13 no feasible mitigation measures have been identified. Therefore, these cumulative traffic impacts would also be significant and unavoidable.

The Project would make significant contributions to the following cumulative transit impacts: transit capacity (Impact TR-17); ridership and capacity utilization at study area cordons (TR-18); transit operation impacts on several transit lines (Impact TR-21, Impact TR-22, Impact TR-23, Impact TR-24, Impact TR-25, Impact TR-26 and Impact TR-27); transit operations on US-101 (TR-28); and regional transit operations on US-101 and Bayshore Boulevard (Impact TR-30). The Project would not make significant contributions to cumulative transit impacts regarding transit capacity utilization at downtown and regional screenlines (Impact TR-19 and Impact TR-20). Mitigation measures (MM TR-17, MM TR-21.1, MM TR-21.2, MM TR-22.1, MM TR-22.2, MM TR-23.1, MM TR-23.2, MM TR-24.1,

[128] These impacts are described in more detail above. The calculations to support these impact conclusions are located in the Transportation Study, attached as Appendix D to this EIR.

MM TR-24.2, MM TR-25, MM TR-26.1, MM TR-26.2, MM TR-27.1, MM TR-27.2) have been identified for most of the Project's cumulative transit impacts (Impact TR-17, Impact TR-18, Impact TR-21, Impact TR-22, Impact TR-23, Impact TR-24, Impact TR-25, Impact TR-26, and Impact TR-27). The identified mitigations would reduce two of the identified Project-related cumulative transit impacts to less-than-significant levels: transit capacity (Impact TR-17) and ridership and capacity utilization at study area cordons (Impact TR-18). For the rest of the cumulative transit impacts for which mitigations have been identified, the mitigations are either uncertain at this time, or would be effective to reduce, but not to completely avoid, the cumulative transit impacts related to the Project. Specifically, this would be the case for all the mitigation measures that have been identified to alleviate congestion-related transit operation impacts on several Muni lines (Impact TR-21, Impact TR-22, Impact TR-23, Impact TR-24, Impact TR-25, Impact TR-26, and Impact TR-27). These cumulative transit impacts, therefore, would remain significant and unavoidable, even with mitigation. There are only two cumulative transit impacts for which no mitigation measures have been identified: transit operations on US-101 (Impact TR-28); and regional transit operations on US-101 and Bayshore Boulevard (Impact TR-30). These cumulative transit impacts associated with the Project would remain significant and unavoidable.

With one localized exception, the Project would make no significant contributions to cumulative bicycle circulation impacts in the area. On the contrary, the Project would have a beneficial impact on bicycle circulation (Impact TR-31). The Project would connect the existing Bayview Hunters Point neighborhood (and the rest of the City) with the proposed waterfront amenities. Specifically, the Project would provide a number of roadways which would facilitate bicycling within and in the vicinity of the Project, including off-street Class I pathways along the Bay, at Candlestick Point, across the proposed Yosemite Slough bridge, and into Hunters Point Boulevard. The Project site would also facilitate completion of the Bay Trail. Overall, bicycle access and the environment for bicycling would improve within and in the vicinity of the Project site, and the facilities would be adequate to meet the bicycling demand associated with the Project and adjacent uses. The one exception would be that of bicycle circulation on Bicycle Routes #70 and #170 along Palou Avenue, between Griffith Street and Third Street. As described above, these bicycle routes may be adversely affected by the combination of the proposed transit preferential treatment and vehicular congestion in the area (Impact TR-32). A mitigation measure has been identified for this impact (MM TR-32), but since its implementation is uncertain at this time, this impact would remain significant and unavoidable.

Pedestrian circulation impacts by their very nature are site-specific and would not contribute to impacts from other development projects. The Project would contribute to cumulative traffic conditions that would affect pedestrian safety but the Project and Project contribution to cumulative pedestrian safety impacts would be less-than significant. The Project would lessen impacts that would otherwise result to cumulative pedestrian safety through its beneficial effects on pedestrian circulation in the area. The Project would provide a connection between the Bayview neighborhood (and the rest of the City) and the waterfront, and would include many pedestrian amenities that would, overall, enhance the pedestrian experience in the Project site and its vicinity (Impact TR-33 and Impact TR-34). Thus, there would be no cumulative pedestrian impacts associated with the Project.

Similarly, the Project would make no significant contribution to cumulative parking impacts. As explained above, other cumulative projects in the area, such as most of the surrounding existing development, Executive Park, and India Basin, are located too far from the Project site to expect that drivers going to

those projects would park at the Project site, or that drivers going to the Project site would park at those sites. Additionally, the topography is not conducive to parking beyond the Project site boundaries. Consequently, there is no potential for significant cumulative parking impacts (Impact TR-35).

Loading impacts, like pedestrian impacts, are by their very nature localized and site-specific, and would not contribute to impacts from other development projects near the Project site. Moreover, the Project would have no loading impacts, as the estimated loading supply would be generally greater than the loading demand, and any effects of unmet loading demand would be temporary inconveniences and not rise to the level of a significant impact (Impact TR-37).

Finally, the Project would contribute to cumulative traffic and transportation impacts associated with 49ers games at the stadium (Impact TR-38 and Impact TR-39); secondary events to be held at the stadium (Impact TR-46 and Impact TR-47), and events at the arena (Impact TR-51 and Impact TR-52). Mitigation measures have been identified for these impacts (MM TR-38, MM TR-39, MM TR-46, MM TR-47, and MM TR-51). However, these mitigation measures would reduce, but not completely avoid the Project's contributions to these cumulative impacts. Therefore, these cumulative impacts would remain significant and unavoidable. The Project would not contribute to cumulative bicycle, pedestrian and parking impacts at these facilities for the reasons explained previously concerning the Project contribution to bicycle, pedestrian and parking impacts (Impact TR-40, Impact TR-41, Impact TR-42, Impact TR-48, Impact TR-49, Impact TR-50, Impact TR-53, Impact TR-54, and Impact TR-55).

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SECTION III.E AESTHETICS

III.E.1 Introduction

This section examines the potential aesthetic impacts of the Project, including light and glare. The section describes the visual context of the Project site and vicinity, including important view corridors and vistas, distinctive visual landmarks (both natural and built), scenic resources, and the overall visual character of the area.

The section identifies visual changes that Project development would create. These changes are demonstrated through computer-generated simulations that show the proposed height, bulk, and massing of the Project's buildings. The analysis focuses on changes from public viewpoints and from existing development and scenic areas in the Project vicinity. The section assesses the Project's potential visual effects based on field reconnaissance by consultants and City/Agency staff and photographs of existing conditions from key viewpoints. The selected viewpoints represent a range of locations where visual changes that would result from the development of the Project would be visible from major roadways, existing public open space or nearby neighborhoods. The viewpoints also include locations outside the immediate Project vicinity where changes would be visible in long-range views.

Photographs within the Project site and from key view locations near the site illustrate the existing Project site conditions. Figure III.E-1 (Viewpoint Locations of Existing Conditions Photographs) through Figure III.E-9 (Existing Shoreline Conditions) include a key map and photographs of the Project site existing conditions.

A key map and short-, mid-, and long-range locations from which photographs of the Project site were taken are illustrated on Figure III.E-10 (Viewpoint Locations) through Figure III.E-30 (View 20: Southeast from Heron's Head Park). Each existing view (denoted as "Existing") is shown with a computer-generated visual simulation of post-Project conditions from the identified viewpoints (denoted as "Proposed").

On the basis of Project plans, relevant urban design policies and guidelines, and analysis of the selected viewpoints, the section provides conclusions on the Project's potential impacts on scenic resources, overall visual character of the Project site and vicinity, and light and glare. This section identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts.

III.E.2 Setting

Existing Visual Character and Views in the Project Vicinity

The Project site is located in the southeastern portion of the City, approximately four miles south of downtown San Francisco. The Project vicinity is defined as the Bayview Hunters Point neighborhood, Candlestick Point, HPS, and India Basin.

The topography of the area varies from flat areas near the San Francisco Bay (the Bay) to undulating slopes and prominent hills, most notably Bayview Hill and Hunters Point Hill. Existing development in the

Project vicinity is generally sited on flat or moderately sloped areas. Steeper slopes are generally undeveloped and vegetated with native and non-native trees, shrubs, and grasses.

Mature trees are also a prominent visual feature on the crests of hills and in other clustered locations in the Project vicinity. As the name Bayview implies, the Bay is visible from many locations throughout the area. The East Bay hills are visible in the distance looking towards the east from locations near the Bay or in hilly neighborhoods.

The Project vicinity is surrounded by visually heterogeneous neighborhoods, including Visitacion Valley to the south, Portola to the west, Bernal Heights to the northwest, and Potrero Hill to the north. The Bay lies to the east (refer to Figure III.E-1). The neighborhoods include single-family houses and apartment buildings, typically from one to four stories, parks and open space, undeveloped properties, a variety of retail and commercial buildings, and industrial structures.

The overall character of the Bayview Hunters Point neighborhood consists of urbanized, moderate-density development. Building heights range from one to four stories, and building massing ranges from small-scale residences to block-scale warehouses. The architectural character includes nineteenth century and early twentieth century residential buildings, commercial buildings (including wood frame and brick structures), World War II–era industrial and commercial facilities, and more recently built warehouses and industrial development. Other recent residential development is found in the Third Street corridor, and other sites on Hunters Point and Bayview Hills.

Transportation corridors are also visual features. Third Street is the major north-south commercial street, with Muni Metro Light-Rail Vehicle (LRV) service. Mixed-use developments, including multi-family housing, are also being developed along the Third Street corridor. The US-101 and I-280 freeways, generally on elevated structures, define neighborhood boundaries further west. Other features include billboards and commercial signage, overhead utility lines, the Caltrain rail corridor, and large public facilities, such as the Southeast Water Pollution Control Plant west of Third Street and the US Postal Service distribution center on Evans Avenue.

Residential neighborhoods in the Bayview Hunters Point neighborhood are east and west of Third Street from US-101 to HPS. A majority of the existing residential uses are single-family units. There are multi-family units distributed on the lower slopes of Bayview Hill and on Hunters Point Hill and newer three- to four-story multi-family units along Jamestown Avenue, Williams Avenue, and Innes Avenue.

Public open space, including public parks and recreation areas along the Bay shoreline, is distributed throughout the Bayview Hunters Point neighborhood. Public parks in the Project vicinity include, but are not limited to, Bayview Playground, Bayview Park, India Basin Shoreline Park, Gilman Playground, other smaller neighborhood parks, the Yosemite Slough area, and the Candlestick Point State Recreation Area (CPSRA). Bayview Hill is west of Candlestick Point and is mostly undeveloped Recreation and Park Department land. Refer to Section III.P (Recreation) for a detailed discussion of public parks, recreation areas, and open space in the Project vicinity.

Land uses immediately surrounding Candlestick Point are varied. Light industrial uses, such as metal fabrication and distribution facilities, are located north of Carroll Avenue. West of Hawes Street and west and south of Candlestick Park, the predominant land use is single-family residential, with new residential

units being constructed south of Jamestown Avenue at Executive Park and other locations. At present, the existing development at Executive Park consists of three office buildings with associated parking and two residential buildings containing 128 units. Three other residential buildings, containing 176 units, are near completion. The area adjacent to the HPS Phase II site to the southwest contains multi-family housing and single-family attached units. Milton Meyer Recreation Center, west of HPS Phase II, is a multi-purpose facility used for afterschool programs, arts and crafts, indoor games, and other training, with game courts and an indoor gym. Uses in the area immediately surrounding the HPS Phase II site, such as industrial uses on Crisp Road, historically provided a buffer between the HPS Phase II site activities and nearby residential uses. Large setbacks and street blocks and a lack of pedestrian amenities were designed to discourage traffic near the shipyard. As discussed in Chapter II (Project Description), HPS Phase II would be adjacent to the under-construction HPS Phase I. The HPS Phase II site surrounds the HPS Phase I development area, a 63-acre site, to the north, east, and south. The HPS Phase I site has been approved for up to 1,600 residential units and 132,000 square feet of commercial development.

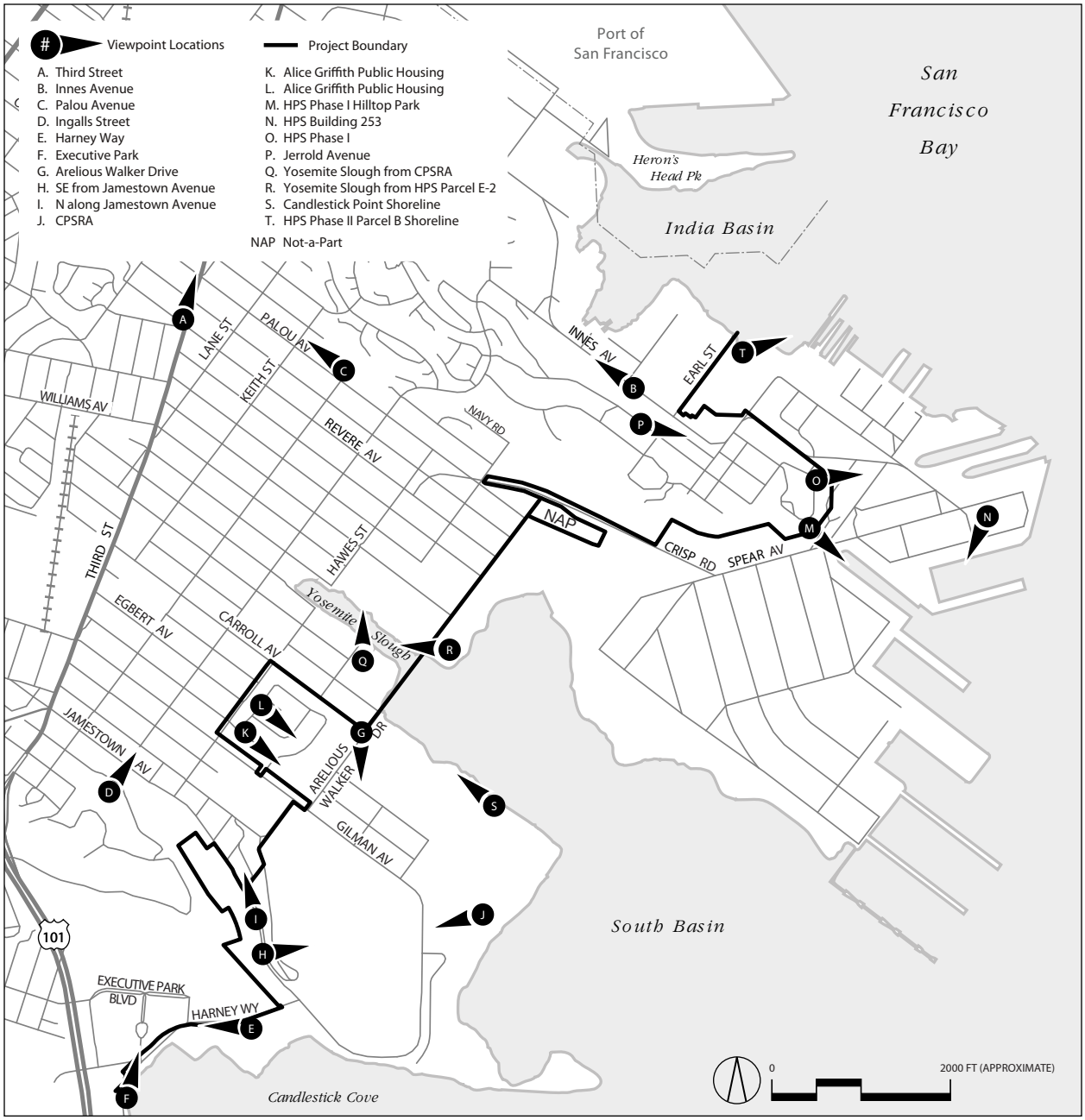
Photographs show existing views of the Project site and of existing conditions of neighborhoods in the Project vicinity. Figure III.E-1 through Figure III.E-9 include a viewpoint location key map and photographs of Project site conditions and of nearby neighborhoods. Figure III.E-10 through Figure III.E-30 include a viewpoint location key map, and short-, mid-, and long-range locations of photographs of the Project site. Figure III.E-11 through Figure III.E-30 illustrate existing views (denoted as "Existing"), and a computer-generated visual simulation of post-Project conditions from the identified viewpoints (denoted as "Proposed").

Important scenic vistas available from the Project site and vicinity are overall views of the Bay, of the East Bay hills, of the hills on the San Francisco peninsula, and views to downtown San Francisco. More local scenic vistas and scenic resources are open space on Bayview Hill, the open space and shoreline of the CPSRA and Yosemite Slough, and India Basin Shoreline Park.

Existing Visual Character and Views in the Project Site

Candlestick Point

The Candlestick Point site contains several land uses: the Candlestick Park stadium, the CPSRA, residential uses on Jamestown Avenue, the Alice Griffith Public Housing site, and a Recreational Vehicle (RV) park. Views of San Francisco Bay are prevalent from all those areas. Overall, the Candlestick Point area appears as a group of disparate features, the stadium surrounded by paved parking, the open space of CPSRA fronting the Bay, other unimproved open space, and residential uses at Alice Griffith Public Housing and on Jamestown Avenue. Privately owned parking lots are adjacent to Candlestick Park parking lots. The vacant, undeveloped lots on Jamestown Avenue are used for overflow stadium parking. Figure III.E-5A (Candlestick Point Existing Conditions) and Figure III.E-5B (Candlestick Point Existing Conditions) illustrate existing conditions at Candlestick Point.



SOURCE: PBS&J, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE III.E-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEWPOINT LOCATIONS OF EXISTING CONDITIONS PHOTOGRAPHS

Viewpoint A: View Northeast along Third Street

Viewpoint B: View Northwest along Innes Avenue

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT AREA
(SURROUNDING NEIGHBORHOOD CHARACTER PHOTOS)

Viewpoint C: View Northwest along Palou Avenue

Viewpoint D: View Northeast of Ingalls Street

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-3

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT AREA
(SURROUNDING NEIGHBORHOOD CHARACTER PHOTOS)

Viewpoint E: View West along Harney Way

Viewpoint F: View of Executive Park from North Bound US 101 Ramp

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-4

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT AREA
(SURROUNDING NEIGHBORHOOD CHARACTER PHOTOS)

Viewpoint G: View South from Arelious Walker Drive

Viewpoint H: View Southeast from Jamestown Avenue

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-5A

Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT EXISTING CONDITIONS

Viewpoint I: View North along Jamestown Avenue

Viewpoint J: View Southwest from CPSRA

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-5B

Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT EXISTING CONDITIONS

Access to most of the site is limited to an arterial loop road (Gilman Avenue/Jamestown Avenue/Bill Walsh Way/Ingerson Avenue) that encircles the Candlestick Park stadium and parking lot. Gilman Avenue and Hawes Street provide access to the Alice Griffith Public Housing site. However, most non-arterial streets from the residential neighborhoods to the west of Candlestick Point reach a dead end before entering the Candlestick Point site. Streets within the Alice Griffith Public Housing complex are internally oriented, and for the most part, do not connect to surrounding streets. In addition, Bayview Hill limits access from the south, except at Harney Way. The lack of street connectivity, combined with Candlestick Point's large, barren parcels, lack of sidewalks, existing storage yards, and low level of on-site activity, contribute to making Candlestick Point relatively unwelcoming from a visual perspective. Vacant parcels appear to be used for illegal dumping, or for spillover parking when the Stadium has sold-out crowds for major events.

Candlestick Park stadium is an oval structure that is approximately 120 feet tall. The stadium sits in the southwestern corner of the Candlestick Point site and is surrounded by surface parking lots. Mature trees, stadium lighting poles, and small structures, such as maintenance, ticketing, and vendor sheds, line the stadium walls. The upper bowl of the stadium is framed by a curved canopy that partially shelters the upper rows of seating. This canopy is a characteristic feature of the stadium when viewed from a distance.

CPSRA within the project boundary is a 120-acre open space that wraps around the Candlestick Point shoreline from Arelious Walker Drive on the north to Harney Way on the south. An additional 34 acres of CPSRA land is outside the project boundary. The CPSRA includes parking areas, a shoreline area with trails providing access to the Bay for water-dependent recreation, picnic areas, a fitness course, bike path, and rocky beaches. Vegetation consists mainly of low-lying shrubs and grasses, with trees interspersed throughout the CPSRA. The shoreline area is lined by beaches and rock armoring. About 30 acres of CPSRA land is currently undeveloped or is leased as parking for Candlestick Park stadium and does not function as public open space. Other portions of the CPSRA contain construction rubble and debris, although some has recently been removed.

The Alice Griffith Public Housing site is bounded by Gilman Avenue on the southwest, Hawes Street on the northwest, Carroll Avenue on the northeast, and Arelious Walker Drive on the southeast. The housing consists of 33 two-story, rectangular apartment buildings sited on a small hill overlooking surrounding development. Although the buildings vary, the architectural character of the buildings is simple and uniform, with stucco facades and metal detailing. Shared open courtyards are interspersed among the buildings. Overhead power and telephone lines are very visible. This area is deteriorated, with broken fencing, graffiti, and trash. Figure III.E-6 (Alice Griffith Public Housing Site Existing Conditions) contains photographs of this area of the Project site.

To the east, the Candlestick RV Park occupies a site on Gilman Avenue. The RV park includes a large paved area surrounded by a low concrete wall. The Jamestown Avenue area, west of and uphill from the stadium, is a residential street, with some undeveloped areas fronting on Jamestown Avenue. Bayview Hill rises immediately west of Jamestown Avenue.

None of the buildings located at Candlestick Point is identified as a scenic resource or a feature of the built environment that contributes to a scenic public setting; however, they are visible and may provide a visual point of reference. Scenic resources at or near Candlestick Point include the CPSRA, Bayview Hill, Yosemite Slough, and the shoreline, as further described below under Analytic Method.

Viewpoint K: Alice Griffith Public Housing Site

Viewpoint L: Alice Griffith Public Housing Site

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-6

Candlestick Point — Hunters Point Shipyard Phase II EIR

ALICE GRIFFITH PUBLIC HOUSING SITE EXISTING CONDITIONS

Hunters Point Shipyard Phase II

The HPS Phase II site appears as an abandoned and deteriorated waterfront industrial setting, with large industrial and administrative buildings, piers, drydocks, and the prominent structure of the Re-Gunning crane,[129] which is located at the end of the Re-gunning Pier. Much of the area is currently in a degraded condition. The scale of the structures contrasts with the slopes of Hunters Point Hill to the west and surrounding waters of the Bay. Most of the structures are in various states of disrepair and a large portion of the shipyard consists of vacant parcels. There are piles of debris in some areas. Vegetation is sparse, consisting primarily of ruderal grasses and shrubs, with a small number of trees, generally located near the former offices, training centers, and barracks in the north. Large expanses of asphalt paving are visible.

The northernmost cluster of development includes a number of single-story sheds and warehouses characterized by simple architecture, corrugated metal or wooden facades, and gabled or flat roofs. Buildings include a number of two- to three-story barracks, training facilities, and office buildings; other Shipyard buildings range from one up to six to nine stories. Between Drydocks 2 and 3, there are a number of pre-War buildings, including Building 205, a former pump house/substation dating to 1901. The architectural character of Building 205 stands out from other structures on site due to the age of the building, its prominent waterfront location, and its red brick façade. This building includes characteristic architectural details such as large arched windows, ornamental overhangs, and a gabled roof. The first building built by the Navy in World War II was Building 231 (1942–1945), the Inside Machine Shop, which was constructed in 1942 by the San Francisco-based firm of Barrett & Hilp and situated adjacent to Drydock 2. Building 211 was also one of the first erected by the Navy. The building was the original Shipfitters Shop and is a good representation of the typical semi-permanent, monitor-roof shop building constructed throughout the Shipyard during the World War II era. Building 224, a concrete air raid/bomb shelter building built in 1944, and later used as an annex for the NRDL, is a unique representative of its type at the Shipyard. The only building within the district completed after World War II is the Optical, Electronics and Ordnance Building, Building 253, finished in 1947 and attached to the west elevation of Building 211. This concrete frame curtain-wall building, designed for the Navy by local architect Ernest J. Kump, was a highly specific repair and research facility. Refer to Figure III.J-1 (HPS Phase II Structures) for the location of the various buildings located on the HPS Phase II site and Figure III.J-3 (Potential Historic Structures) for a photograph of Buildings 211, 231, and 253. Both of these figures are contained in Section III.J (Cultural Resources and Paleontological Resources). Other wood and concrete framed structures range from one to four stories in height. These structures do not possess any unique distinguishing characteristics, save for varied massing and rooftop appurtenances. Most of the site remains fenced off, prohibiting public access from surrounding neighborhoods for public safety reasons. As with Candlestick Point, the HPS Phase II site lacks pedestrian amenities, such as sidewalks. Figure III.E-7A (HPS Phase II Existing Conditions) and Figure III.E-7B (HPS Phase II Existing Conditions) illustrate the existing conditions at Hunters Point.

None of the buildings or structures located at HPS Phase II is designated as a scenic resource or a feature of the built environment that contributes to a scenic public setting; however, they are visible and may provide a visual point of reference, and, in some cases, may be considered historic (refer to Section III.J for a discussion

[129] Re-gunning cranes are a type of cranes used in shipbuilding and repair that are particularly suited to lift heavy objects such as ship engines.

of historic buildings). Scenic resources at or near Hunters Point Phase II include the Yosemite Slough, the Re-gunning crane, and the shoreline, as further described below under Analytic Method.

The topography of the HPS Phase II site is generally flat, except for the area around Building 101. The Bay is visible between and beyond structures throughout the site. HPS Phase I, now under development, occupies higher ground west of the HPS Phase II site.

Drydocks and piers, many of which are in disrepair, create a pattern of inlets along the Bay. On the 405-foot-wide Re-gunning Pier, the Re-gunning crane supported on four towers straddles the pier and rises to 182 feet. Much of the HPS shoreline is armored by a concrete seawall. The seawall does not rise above the existing shoreline.

Yosemite Slough

The Yosemite Slough is a slow-moving tidal channel that winds through a marsh between Hunters Point and Candlestick Point. Except for the mouth of the slough across which the bridge would be constructed, the Slough is not within the Project site. The Slough contains narrow patches of salt marsh habitat, varying in length from 20 to 100 feet,[130] as well as mud flats that are exposed at low tides once or twice a day along its shorelines. The Slough is habitat and feeding grounds for adult fish and invertebrates, water and shorebirds, and some mammals. The Slough operates to bring in fresh nutrients at high tide and flush out pollution and detritus at low tide. Ruderal vegetation occurs on both sides of the Slough. There are also some areas with dirt and debris piles, old fencing, and riprap along the shoreline. Figure III.E-8 (Yosemite Slough Existing Conditions) contains photographs of the Slough.

Shoreline

The Candlestick Point shoreline is characterized by slopes protected by riprap or concrete debris and beach-fronted, unprotected slopes (refer to Figure III.E-9 [Existing Shoreline Conditions]). The top of the bank in this area ranges from a localized low spot of four feet to as much as 22 feet above sea level. Active erosion was observed in higher portions of the embankment.[131] The existing shoreline on the HPS Phase II site is characterized by a combination of riprap-protected slopes, unprotected embankments fronted by a beach, concrete submarine drydocks, pile-supported wharf, dilapidated piers, quay-wall structures, unprotected natural shoreline with debris (broken concrete, broken bricks, and random pieces of rock) lining the edges, and beach-fronted, unprotected slopes. The shoreline shows areas of erosion as well as areas of vegetation and habitat growth within the intertidal zone.[132]

[130] H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009.
[131] Moffatt & Nichol, *Proposed Shoreline Improvements*, September 2009.
[132] Moffatt & Nichol, *Proposed Shoreline Improvements*, September 2009.

Viewpoint M: View Southeast from HPS Phase I Hilltop Park

Viewpoint N: View Southwest from HPS Building 253

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-7A

Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS PHASE II EXISTING CONDITIONS

Viewpoint O: View East from HPS Phase I

Viewpoint P: View East from Jerrold Avenue

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-7B

Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS PHASE II EXISTING CONDITIONS

Viewpoint Q: View of Yosemite Slough from CPSRA

Viewpoint R: View of Yosemite Slough from HPS Parcel E-2

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-8

Candlestick Point — Hunters Point Shipyard Phase II EIR

YOSEMITE SLOUGH EXISTING CONDITIONS

Viewpoint S: Candlestick Point Shoreline

Viewpoint T: HPS Phase II Parcel B Shoreline

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-9

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING SHORELINE CONDITIONS

Existing Light and Glare Conditions

Existing light and glare conditions at the Project site and in the vicinity are typical of urban areas, with street lighting and exterior lighting at residential, public, and commercial structures. Lighting is seen during night periods along street corridors and on buildings throughout the area. Night parking lot lighting is also visible at the occupied portions of the Project site. The night lighting patterns are visible from residential neighborhoods on hillside areas such as Jamestown Avenue or Hunters Point Hill.

Candlestick Park stadium lighting is operated during evening or night events. Depending upon time of day and weather conditions, stadium lighting operates for up to eleven San Francisco 49ers home football games per year. Stadium lighting typically does not operate after 10:00 P.M. for night games. The stadium light is visible from nearby areas, including residential uses at Executive Park, the Bayview Hunters Point neighborhood west of Candlestick Park, and Hunters Point Hill. Parking lots associated with the stadium are lighted during night events, which adds to the ambient light from the stadium area during those periods.

Public Viewpoints

To determine the potential changes to the visual character in the Project vicinity, PBS&J photographed the site from various important public viewpoints, determined in coordination with City staff. Figure III.E–10 (Viewpoint Locations) is a key map illustrating viewpoint locations. Important public viewpoints toward the Project site include vantage points such as the following:

- Twin Peaks (Figure III.E-11 [View 1: Southeast from Twin Peaks])
- Bernal Heights Park (Figure III.E-12 [View 2: Southeast from Bernal Heights])
- McLaren Park (Figure III.E-13 [View 3: East from McLaren Park])
- Potrero Hill (Figure III.E-14 [View 4: South from Potrero Hill])
- San Bruno Mountain (Figure III.E-17 [View 7: Northeast from San Bruno Mountain])
- Oyster Point (Figure III.E-18 [View 8: North from Oyster Point])
- the CPSRA (Figure III.E-19 [View 9: North from CPSRA South of Harney Way], Figure III.E-21 [View 11: Northwest from CPSRA], and Figure III.E-23 [View 13: West from CPSRA])
- Bayview Hill (Figure III.E-20 [View 10: Northeast from Bayview Hill])
- Hunters Point Hill (Figure III.E-28 [View 18: South from Hilltop Open Space] and Figure III.E-29 [View 19: East from Hunters Point Hill Open Space])
- Heron's Head Park (Figure III.E-30 [View 20: Southeast from Heron's Head Park])

Because significant views of the Project site from neighboring residential and commercial areas would change, views from adjacent neighborhoods are also documented in photographs in Figure III.E-22 (View 12: Southeast from Gilman Avenue) and Figure III.E-26 (View 16: Southwest from Mariner Village]). It should be noted that the "existing" views do not include already approved projects that have not yet been completed (HPS Phase I, Executive Park) but would be built by the time the Project is built out. The following describes existing views of the Project site as seen from these viewpoints.

Prominent Features

There are several features and landmarks within the Project site that are visible from distant viewpoints. These features are summarized to assist the reader in identifying the location of the HPS and Candlestick Point portions of the Project site in the photos and simulations:

- The location of HPS is marked by the 182-foot-tall Re-gunning crane and former Navy buildings up to nine stories in height. Prominent structures include the six-story Building 253 in the eastern portion of the site and the nine-story officer's quarters in the south of the site.
- Candlestick Park is a notable feature from many viewpoints. The height of the stadium is 120 feet. The stadium's light towers reach heights of 240 feet. Bayview Hill, while not part of the site, is immediately west of Candlestick Park and can be used in the photos to locate the Candlestick Point site.

View 1: Southeast from Twin Peaks (Figure III.E-11)

This viewpoint provides a long-range view of the Project site facing southeast from a position on Twin Peaks, approximately 4 miles northwest of the Project site. Low-rise, medium-density urban development that is characteristic of the southeastern portion of San Francisco is visible in the foreground. Major topographical features that are visible from this viewpoint include Bernal Heights (elevation 433 feet) in the foreground and Hunters Point Hill (elevation 275 feet) and Bayview Hill (elevation 413 feet) near the shoreline.

Views of the Project site are visible along the shoreline between Hunters Point Hill and Bayview Hill. At this distance, the Re-gunning crane at HPS and Candlestick Park is only faintly visible. The Bay and the East Bay hills are visible in the distance.

View 2: Southeast from Bernal Heights (Figure III.E-12)

This viewpoint provides a long-range view of the Project site facing southeast from about 2 miles northwest of the Project site. From this viewpoint, low-rise, medium-density residential, commercial, and industrial development characteristic of the BVHP neighborhood is visible. Interstate 280 (I-280), which crosses the northern portion of the BVHP neighborhood, and US-101, which provides the western boundary of the BVHP neighborhood, are also prominently visible in the mid-ground. The Project site is visible along the shoreline between Hunters Point Hill and Bayview Hill. Candlestick Park is faintly visible from this viewpoint, while HPS is partially obstructed by Hunters Point Hill. Yosemite Slough and the South Basin, which bisect the Project site, are also visible. (Figure E.III-12 illustrates the location of the Yosemite Slough and the South Basin relative to Candlestick Point and HPS Phase II.) The Bay and the East Bay hills are visible in the distance.

View 3: East from McLaren Park (Figure III.E-13)

This viewpoint provides a long-range view of the Project site facing east from approximately 1 mile west of the Project site. From this viewpoint, low-rise, medium-density residential development characteristic of the Bayview Hunters Point neighborhood is visible. HPS is visible from this viewpoint, although somewhat obscured by intervening development and Bayview Hill. Candlestick Point is not directly visible from this line of sight. The Bay and the East Bay hills are visible in the distance.

View 4: South from Potrero Hill (Figure III.E-14)

This viewpoint provides a long-range view of the Project site facing south from a position about 1 mile north of the Project site. From this viewpoint, low-rise, medium-density residential, commercial, and industrial development, characteristic of the Bayview Hunters Point neighborhood is visible, as is a large stretch of US-101. The Re-gunning crane and buildings at HPS are visible to the east of Hunters Point Hill. Views of Candlestick Point are obscured by intervening development, with the exception of Candlestick Park, which is visible. The Bay and the East Bay hills are visible in the distance.

View 5: Northeast from Northbound US-101 (Figure III.E-15)

This viewpoint provides a long-range view of the Project site facing northeast from approximately 1 mile to the southwest, with the Bay as the major foreground. From this viewpoint, the Project site is visible along the shoreline of Candlestick Cove. Candlestick Point, Bayview Hill, and Candlestick Park are prominently visible in the mid-ground. Residential and commercial development to the west of Candlestick Park is also visible. Views of HPS, marked by the Re-gunning crane, are further in the distance. The continuing Bay and the East Bay hills are visible in the distance.

View 6: Northeast from US-101 at Harney Way Off-Ramp (Figure III.E-16)

This viewpoint provides a closer view of the Project site facing northeast from about a half mile to the southwest. From this viewpoint, Bayview Hill appears in the background, with residential and commercial development at Executive Park at the base of hill. The heights of the residential structures are five stories, while the heights of the commercial structures vary from three to eight stories. Views of grassland and vegetation that are a part of the CPSRA are also visible from this viewpoint, along with a partial view of Candlestick Park. The Bay and the East Bay hills are visible in the distance.

View 7: Northeast from San Bruno Mountain (Figure III.E-17)

This viewpoint provides a long-range view of the Project site facing northeast from approximately 3 miles to the southwest. The structures within HPS, including wharfs and docks, storage and maintenance facilities, administrative and support facilities, and base housing, are visible to the northeast of Bayview Hill. Similarly, a prominent view of Candlestick Point, including residential and office development at Executive Park, a partial view of Candlestick Park and lands within the CPSRA are also available. The Bay and the East Bay hills are visible in the distance.

View 8: North from Oyster Point (Figure III.E-18)

This viewpoint provides a view of the Project site from approximately 2 miles to the south. The view north from the Oyster Point peninsula in the City of South San Francisco provides a view of the Bay in the foreground, with Bayview Hill, Candlestick Point (including Candlestick Park stadium), and the Shipyard visible in the background. The East Bay hills are visible in the distance. Existing development in San Francisco west of Bayview Hill, at Executive Park, and on Hunters Point Hill are also visible. The upper portions of structures in downtown San Francisco are visible to the east of Bayview Hill. The location of Candlestick Point is marked by Candlestick Park stadium; the location of HPS is marked by the Re-gunning crane. Other facilities within HPS are also visible.

View 9: North from CPSRA South of Harney Way (Figure III.E-19)

This viewpoint provides a prominent southern upslope view of Candlestick Park from the CPSRA. The upper tier of the reinforced concrete structure, along with four light towers, is visible from this viewpoint. Residential development at Executive Park to the west of the stadium is also visible along with grassland and vegetation that is part of the CPSRA. No long-distance views to the north are available from this vantage point.

View 10: Northeast from Bayview Hill (Figure III.E-20)

This viewpoint provides a view of the Project site from public open space on Bayview Hill, between existing trees in the foreground, and includes Jamestown Avenue at the base of the Bayview Hill, areas south of Yosemite Slough within the CPSRA, currently operated as parking for Candlestick Park stadium, and, north of the Slough, the Shipyard and the approved HPS Phase I development area. The Bay is visible in the distance.

View 11: Northwest from CPSRA (Figure III.E-21)

This viewpoint provides a view of Candlestick Park and its vicinity looking northwest from the CPSRA. Candlestick Park and Bayview Hill across South Basin are visible. A view of grassland and vegetation in the CPSRA is also available along the shoreline. A partial view of Bernal Heights is visible in the distance.

View 12: Southeast from Gilman Avenue (Figure III.E-22)

This viewpoint provides a view of the Project site looking southeast down Gilman Avenue towards Candlestick Point. Views of the streetscape dominate the foreground. The most prominent views are of single-family residential development consisting of two-story blockhouses of various architectural styles. Utility poles (about 40 feet high) connecting overhead wires and parked cars along the street are also visually prominent. Medium-range views consist of additional residential development and an overhead pedestrian bridge. The Bay and the East Bay hills are visible in the distance.

View 13: West from CPSRA (Figure III.E-23)

This viewpoint provides a view from the east corner of Candlestick Point looking west towards Bayview Hill. Views of an unpaved parking area (within the CPSRA), parking barriers, and utility poles dominate the foreground. There are views of the two-story residential buildings that are a part of the Alice Griffith Public Housing site to the northwest. Medium-range views encompass other two- to three-story apartment buildings at the base of Bayview Hill. There are limited long-range views of development to the northwest in the distance.

View 14: Southeast from CPSRA (Figure III.E-24)

This viewpoint faces southeast along Yosemite Slough, which is between Candlestick Point and HPS. The inlet to Yosemite Slough and grassland dominate the foreground. Medium-range views consist of various structures associated with the shipyard, including storage and maintenance facilities and the Re-gunning crane. Views of the former Naval Radiological Defense Laboratory building and the former Officer's Quarters building are present. To the east, the East Bay hills are visible in the distance.

View 15: Southeast from Palou Avenue (Figure III.E-25)

This viewpoint provides a view southeast down Palou Avenue towards HPS. Views of the streetscape dominate the foreground. The most prominent views are of two-story, single-family residential homes. Medium-range views are of structures within the shipyard, including storage and maintenance facilities and the former Officer's Quarters building. The Bay and the East Bay hills are visible in the distance.

View 16: Southwest from Mariner Village (Figure III.E-26)

This viewpoint provides a view southwest across the Project site from the Mariner's Village area on Hunters Point Hill north of the Shipyard. Foreground views consist of a grass field and ancillary structures associated with HPS. Medium-range views consist of the South Basin, the CPSRA, and Candlestick Park. Medium-range views also consist of residential development located at the base of Bayview Hill. San Francisco Bay shoreline and San Bruno Mountain are visible in the background.

View 17: Northeast from CPSRA (Figure III.E-27)

This viewpoint provides a view of the HPS Phase II site north from the eastern tip of Candlestick Point. Structures within HPS, including storage and maintenance facilities and the Re-gunning crane, are visible. The most prominent on-site structure visible from this viewpoint is the nine-story officer's quarters. To the west is the seven-story, former Naval Radiological Defense Laboratory Headquarters. The Bay and the East Bay hills are visible in the distance.

View 18: South from Hilltop Open Space (Figure III.E-28)

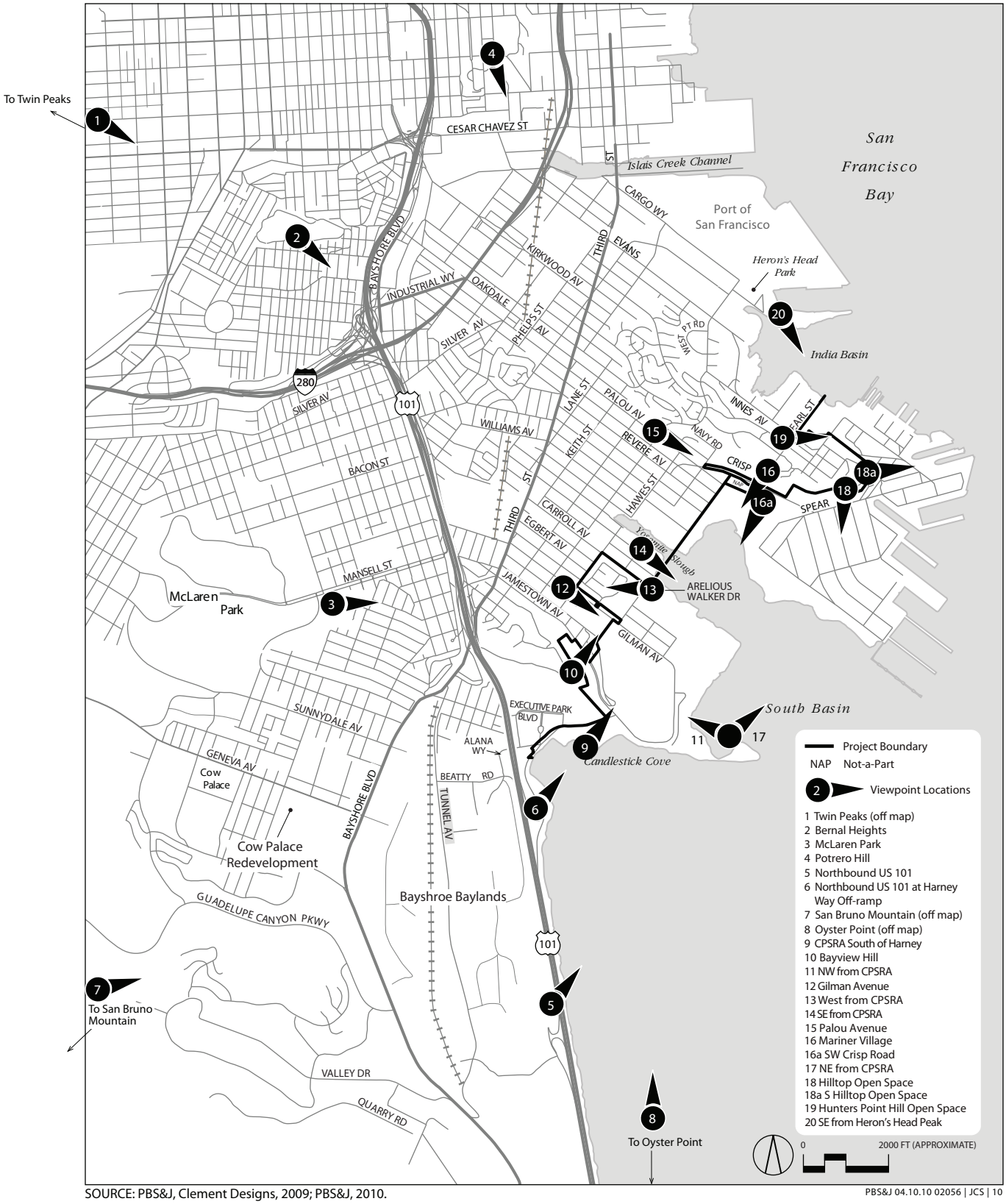
This viewpoint provides a view south across the southern portion of HPS, from open space that would be completed as part of HPS Phase I. Close-range views consist of abandoned storage and maintenance facilities that range from one to five stories in height. The Re-gunning crane is prominently visible from this viewpoint. Views of paved roadways/lots, fences, and utility poles in various stages of disrepair are also present from this viewpoint. Medium-range views consist of wharfs and docks at the southeastern point of HPS. The Santa Cruz Mountains along the San Francisco Peninsula are visible in the distance.

View 19: East from Hunters Point Hill Open Space (Figure III.E-29)

This viewpoint provides a view east across the northern portion of HPS. The foreground includes a large paved lot, storage buildings, and abandoned HPS buildings, which range from one to four stories in height, within the shipyard. Views of paved roadways, fences, and utility poles in various stages of disrepair are present from this viewpoint, as well as a view of a wharf along the shoreline. A prominent stand of trees approximately 30 to 50 feet tall is in the center of the shipyard. The Bay and the East Bay hills are visible in the distance.

View 20: Southeast from Heron's Head Park (Figure III.E-30)

This viewpoint provides a view southeast from Heron's Head Park across India Basin towards HPS. Views consist of structures in the shipyard, including storage and maintenance facilities and the Re-gunning crane. Low-rise residential development (approximately three stories) is visible on Hunters Point Hill to the west. San Francisco Bay and the East Bay hills are visible in the distance.



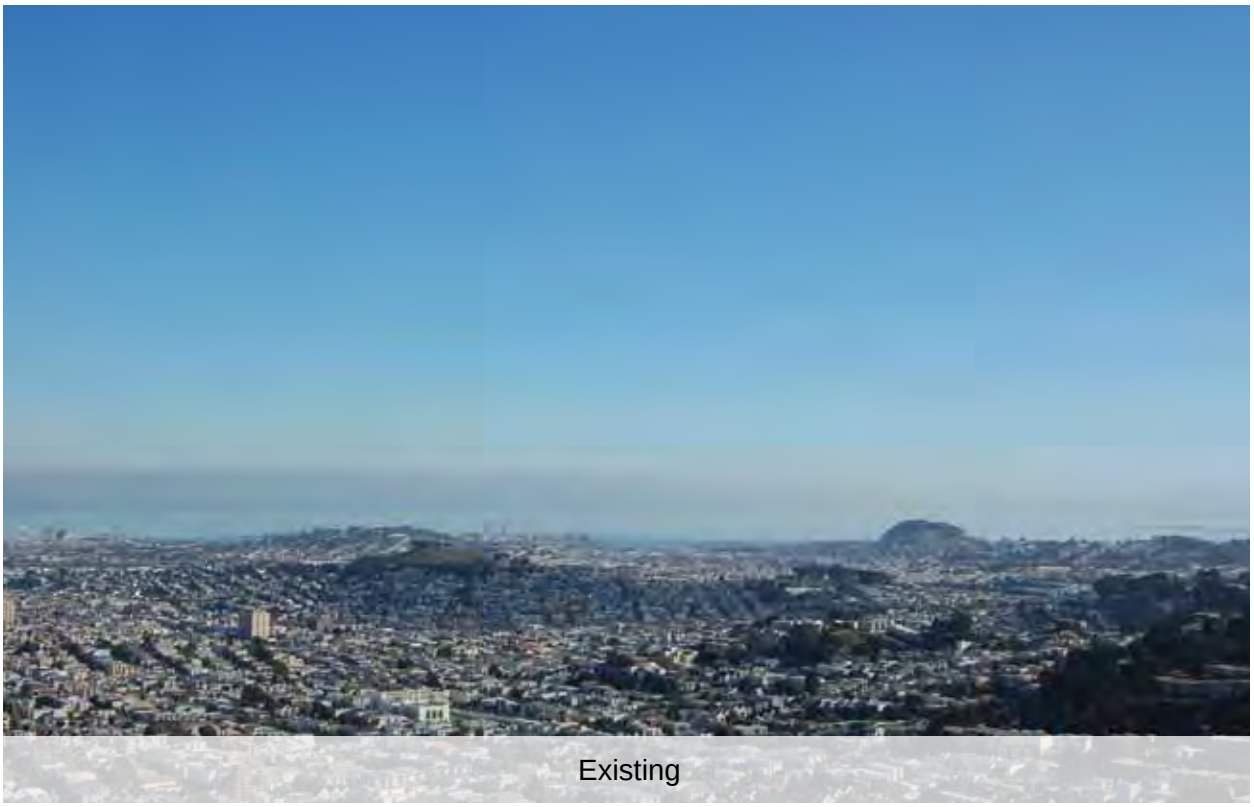
SOURCE: PBS&J, Clement Designs, 2009; PBS&J, 2010.

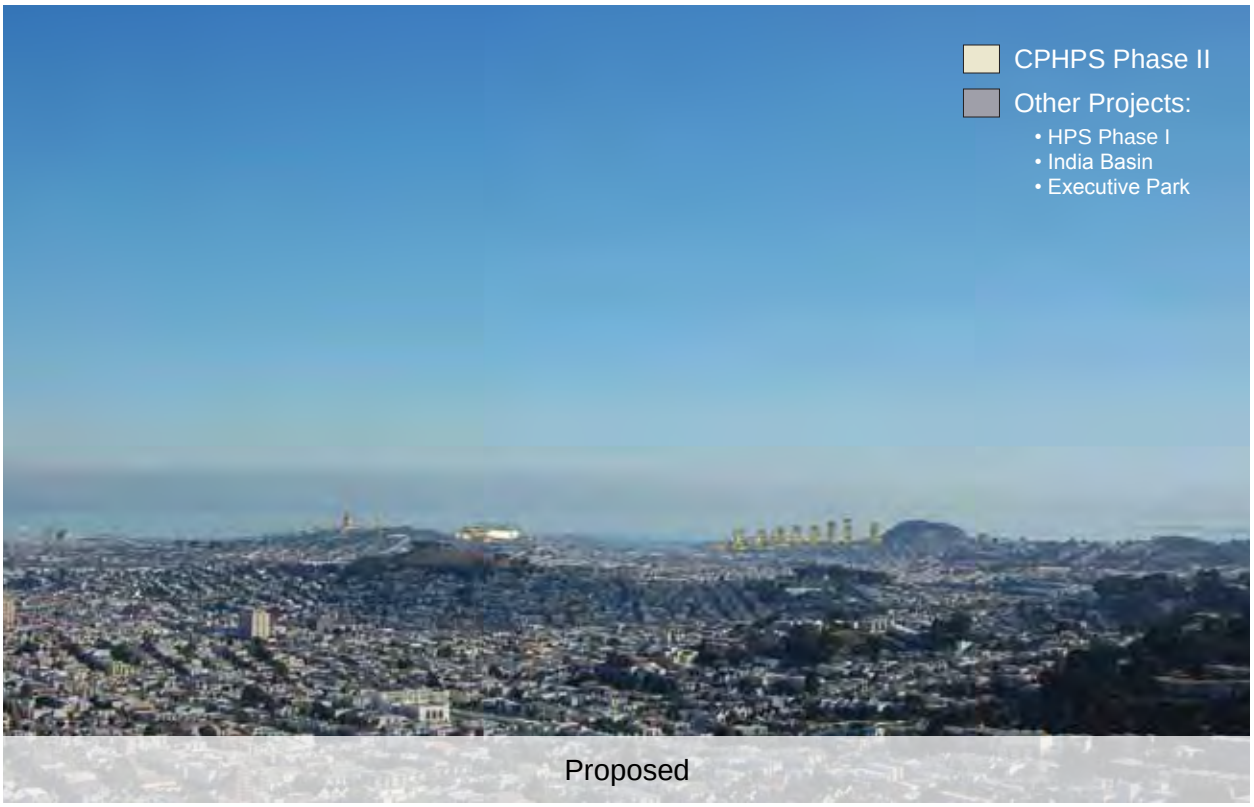
PBS&J 04.10.10 02056 | JCS | 10

FIGURE III.E-10

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEWPOINT LOCATIONS





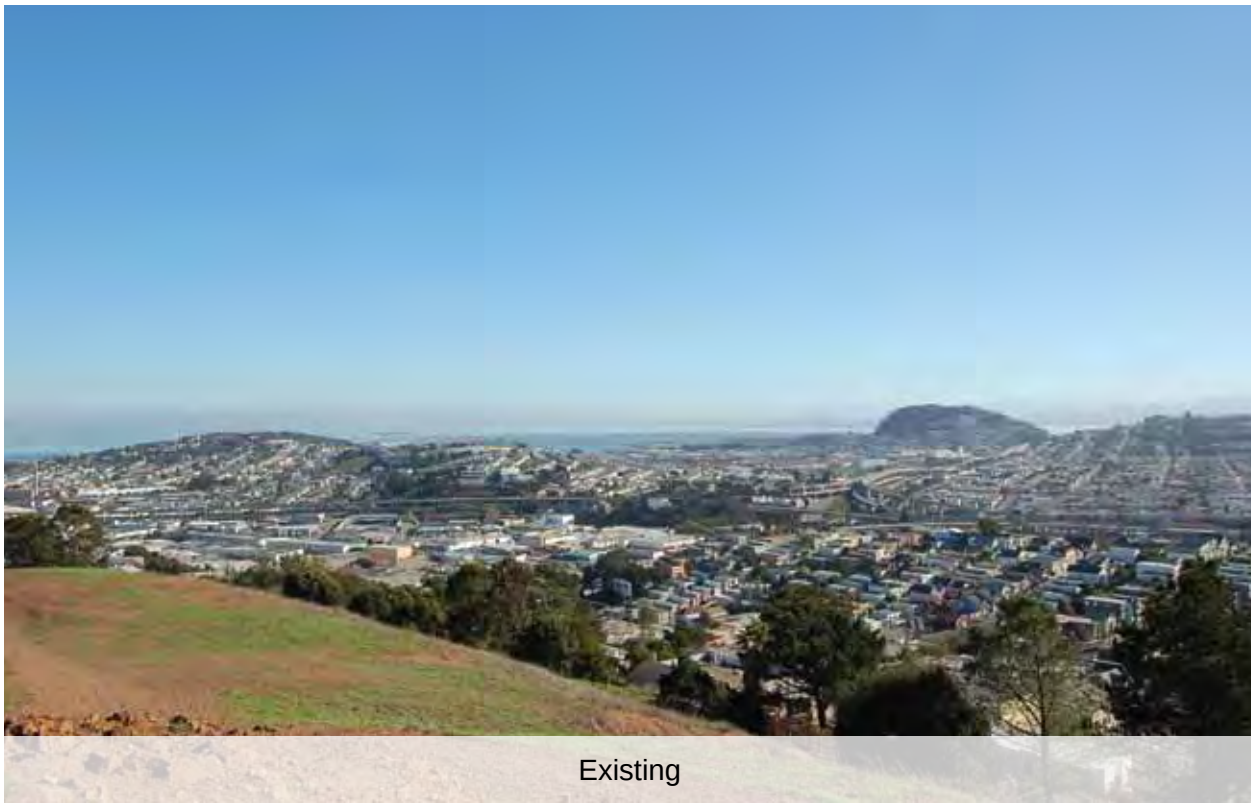
SOURCE: Lennar Urban, 2009.

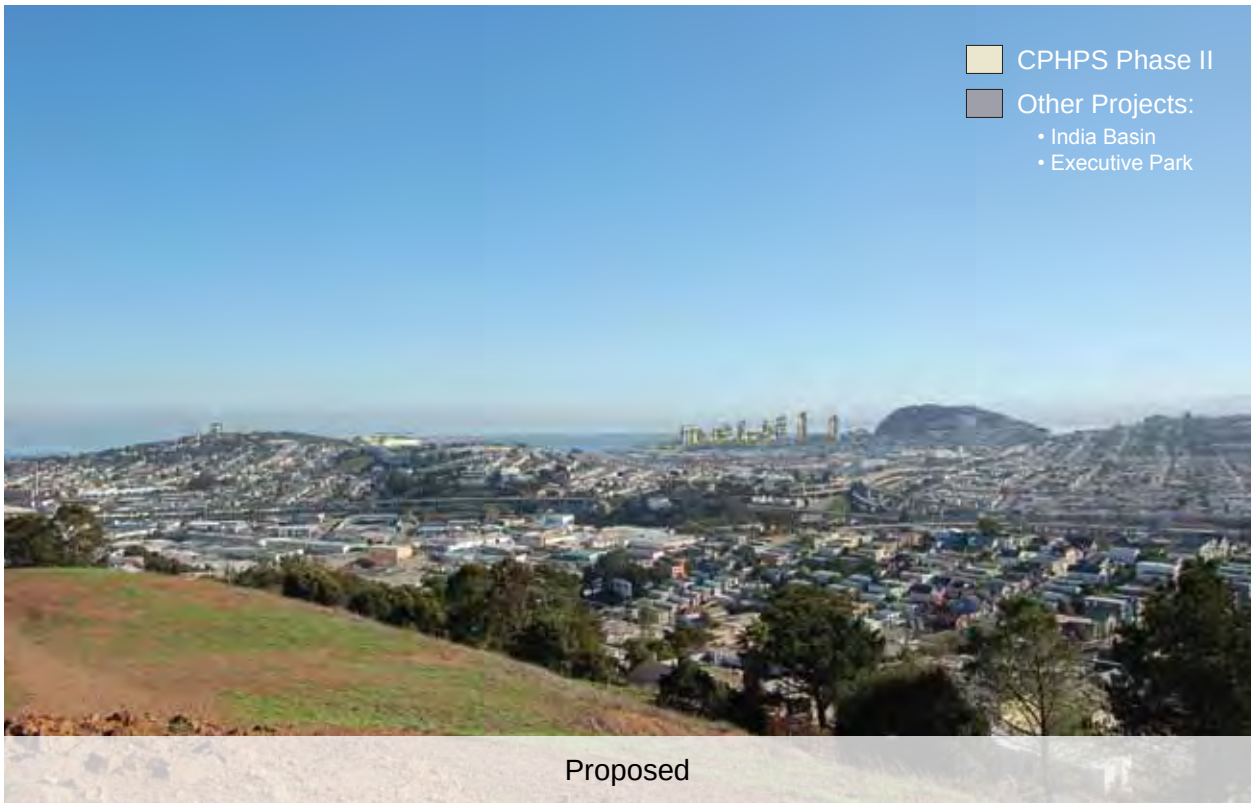
PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-11

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 1: SOUTHEAST FROM TWIN PEAKS





SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-12

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 2: SOUTHEAST FROM BERNAL HEIGHTS

Existing

Proposed

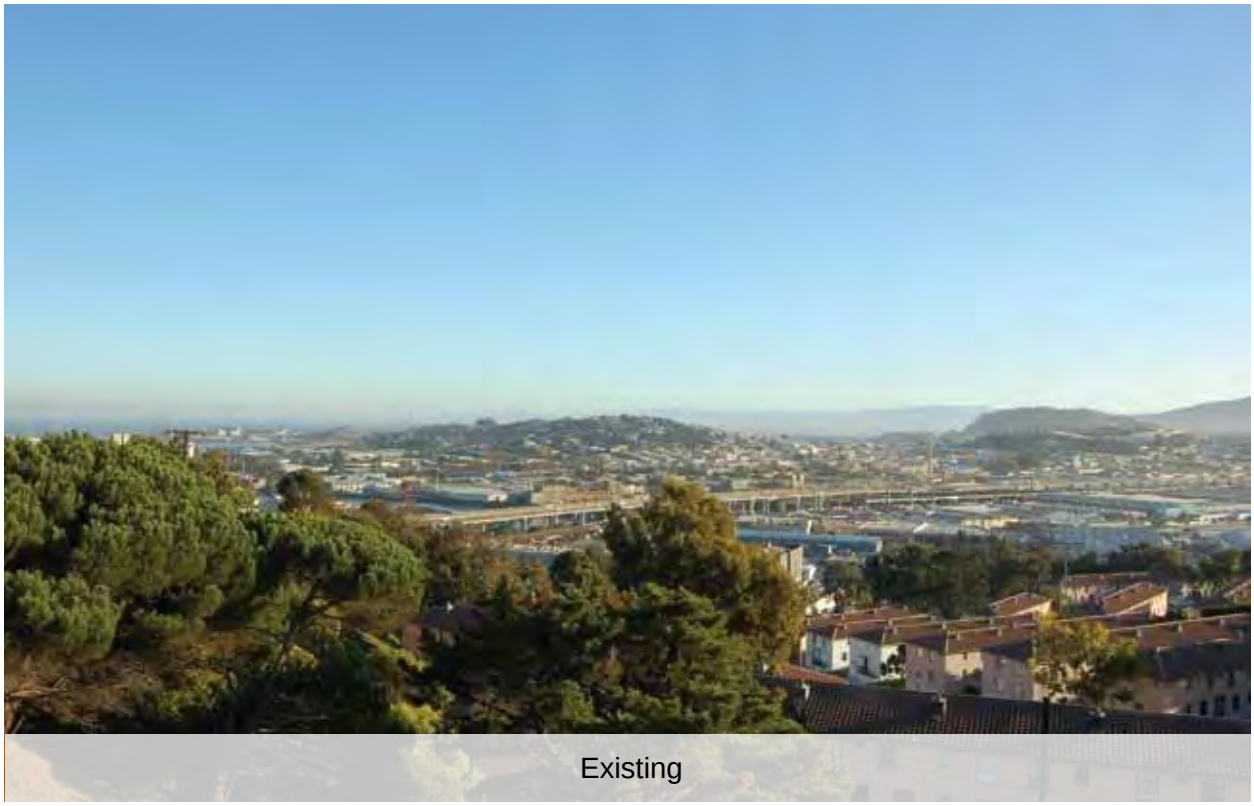
SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

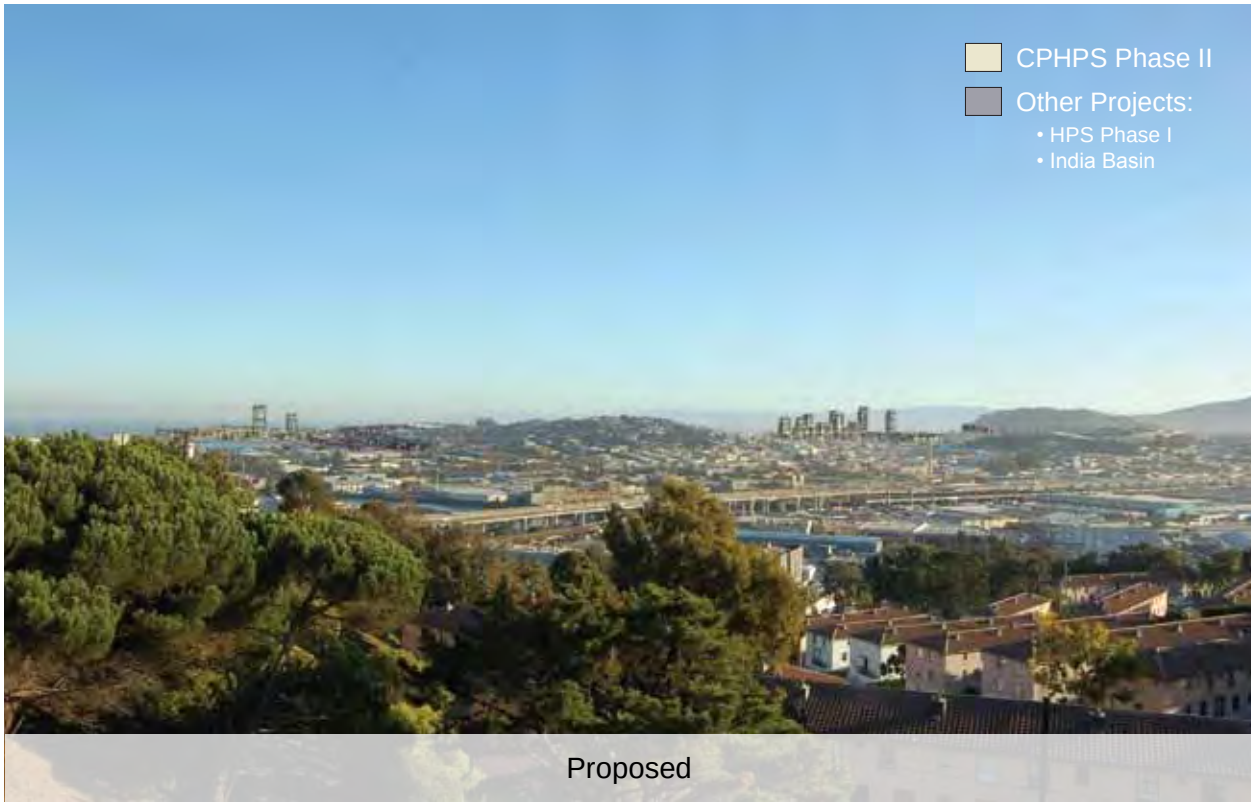
FIGURE III.E-13

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 3: EAST FROM McLAREN PARK



Existing



Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-14

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 4: SOUTH FROM POTRERO HILL

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-15

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 5: NORTHEAST FROM NORTHBOUND US 101

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-16

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 6: NORTHEAST FROM US 101 AT HARNEY WAY OFF-RAMP

Existing

Proposed

SOURCE: Lennar Urban, 2009.

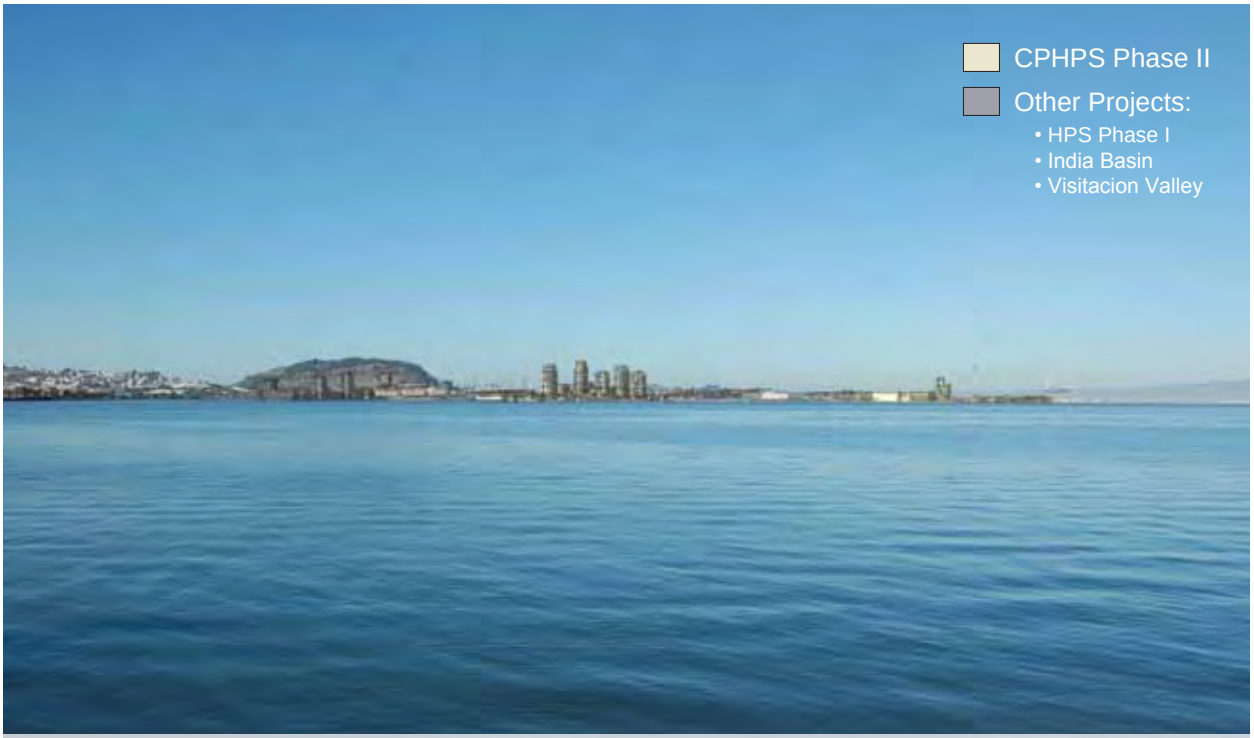
PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-17

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 7: NORTHEAST FROM SAN BRUNO MOUNTAIN

Existing



Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-18

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 8: NORTH FROM OYSTER POINT

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-19

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 9: NORTH FROM CPSRA SOUTH OF HARNEY WAY

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-20

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 10: NORTHEAST FROM BAYVIEW HILL

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-21

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 11: NORTHWEST FROM CPSRA

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-22

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 12: SOUTHEAST FROM GILMAN AVENUE

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-23

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 13: WEST FROM CPSRA

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-24

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 14: SOUTHEAST FROM CPSRA

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-25

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 15: SOUTHEAST FROM PALOU AVENUE

SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-26

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — SEPTEMBER 21 (NOON PDT)

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-27

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 17: NORTHEAST FROM CPSRA

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-28

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 18: SOUTH FROM HILLTOP OPEN SPACE

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-29

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 19: EAST FROM HUNTERS POINT HILL OPEN SPACE

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-30

Candlestick Point — Hunters Point Shipyard Phase II EIR

VIEW 20: SOUTHEAST FROM HERON'S HEAD PARK

III.E.3 Regulatory Framework

Federal

There are no federal regulations, plans, or policies applicable to the aesthetics issues of the Project.

State

Candlestick Point State Recreation Area General Plan

The CPSRA General Plan provides general guidelines and identifies conceptual land uses, facilities, and park improvements within the CPSRA area. The CPSRA General Plan addresses enhanced appreciation of the natural resources of the Bay. The Plan seeks to manage the resources of the CPSRA in conformity with maintaining a desirable physical setting on the Bay shore. Design guidelines for proposed land uses and SRA improvements were established to "create an environment that supports the physical, social, psychological, economic, and aesthetic needs of humanity." The design criteria further guide development for compatibility with the land form. Refer to Section III.B (Land Use and Plans) for a full description of these policies and objectives.

Local

San Francisco General Plan

The *San Francisco General Plan* Urban Design Element is concerned with the physical character and environment of the City with respect to development and preservation. The Urban Design Element addresses issues related to City pattern, guidelines for major new development, and neighborhood environment. This element also promotes the preservation of landmarks, structures, and natural features with notable historic, architectural, or aesthetic value. The following policies would be relevant to the Project.

Objective 1 Emphasis of the characteristic pattern which gives to the city and its neighborhoods an image, a sense of purpose, and a means of orientation.

- Policy 1.1 Recognize and protect major views in the city, with particular attention to those of open space and water.
- Policy 1.2 Recognize, protect and reinforce the existing street pattern, especially as it is related to topography.
- Policy 1.3 Recognize that buildings, when seen together, produce a total effect that characterizes the city and its districts.
- Policy 1.4 Protect and promote large-scale landscaping and open spaces that define districts and topography.
- Policy 1.5 Emphasize the special nature of each district through distinctive landscaping and other features.
- Policy 1.6 Make centers of activity more prominent through design of street features and by other means.

Policy 1.7 Recognize the natural boundaries of districts, and promote connections between districts.

Objective 2 Conservation of resources which provide a sense of nature, continuity with the past, and freedom from overcrowding.

Policy 2.1 Preserve in their natural state the few remaining areas that have not been developed by man.

Policy 2.2 Limit improvements in other open spaces having an established sense of nature to those that are necessary, and unlikely to detract from the primary values of the open space.

Policy 2.3 Avoid encroachments on San Francisco Bay that would be inconsistent with the Bay Plan or the needs of the city's residents.

Policy 2.4 Preserve notable landmarks and areas of historic, architectural, or aesthetic value, and promote the preservation of other buildings and features that provide continuity with past development.

Policy 2.6 Respect the character of older development nearby in the design of new buildings.

Policy 2.7 Recognize and protect outstanding and unique areas that contribute in an extraordinary degree to San Francisco's visual form and character.

Objective 3 Moderation of major new development to complement the city pattern, the resources to be conserved, and the neighborhood environment.

Policy 3.1 Promote harmony in the visual relationships and transitions between new and older buildings.

Policy 3.2 Avoid extreme contrasts in color, shape and other characteristics which will cause new buildings to stand out in excess of their public importance.

Policy 3.3 Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.

Policy 3.4 Promote building forms that will respect and improve the integrity of open spaces and other public areas.

Policy 3.5 Relate the height of buildings to important attributes of the city pattern and to the height and character of existing development.

Policy 3.6 Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.

Policy 3.8 Discourage accumulation and development of large properties, unless such development is carefully designed with respect to its impact upon the surrounding area and upon the city.

Objective 4 Improvement of the neighborhood environment to increase personal safety, comfort, pride, and opportunity.

Policy 4.5 Provide adequate maintenance for public areas.

Policy 4.6 Emphasize the importance of local centers providing commercial and government services.

Policy 4.12 Install, promote, and maintain landscaping in public and private areas.

Policy 4.13 Improve pedestrian areas by providing human scale and interest.

Policy 4.14 Remove and obscure distracting and cluttering elements.

Policy 4.15 Protect the livability and character of residential properties from the intrusion of incompatible new buildings.

San Francisco Bay Conservation and Development Commission (BCDC) Public Access Design Guidelines for the San Francisco Bay

Along the Bay shoreline, BCDC's land use authority relates primarily to public access; however, some of the public access objectives specifically seek to provide, maintain, and enhance visual access to the Bay and shoreline, and maintain and enhance the visual quality of the Bay, shoreline, and adjacent development. In addition, Chapter IV (Site-Specific Public Access Improvements) of BCDC's Design Guidelines contain specific strategies for development to enhance the visual experience along the Shoreline. Refer to Section III.B (Land Use and Plans) for a full description of these Design Guidelines.

Bayview Hunters Point Area Plan

The *Bayview Hunters Point Area Plan* (BVHP Area Plan) is an adopted component of the *San Francisco General Plan* that serves as a guide to the future development of the BVHP community.[133] It includes sections on Land Use, Transportation, Housing, Industry, Urban Design, Recreation and Open Space, Community Facilities and Services, and Public Safety. The BVHP Area Plan excludes HPS. BVHP Area Plan objectives and policies are designed to preserve and enhance existing residential neighborhoods, enhance the distinctive and positive features of Bayview Hunters Point, and improve the definition of the overall urban pattern of Bayview Hunters Point.

Specific BVHP Area Plan objectives and policies that pertain to visual resources include the following:

Objective 5 Preserve and enhance existing residential neighborhoods.

Policy 5.1 Preserve and enhance the existing character of residential neighborhoods.

[133] San Francisco Planning Department, *San Francisco General Plan, Bayview Hunters Point Area Plan*, March 2006. The Area Plan, formerly named the *South Bayshore Area Plan*, was adopted in February 1970 (Board of Supervisors Resolution No. 6486). Subsequently, the Area Plan was updated in July 1995 (Resolution No.13917). The current 2006 Area Plan was renamed the *Bayview Hunters Point Area Plan* at the community's request to reflect its historic name for itself.

Objective 10 Enhance the distinctive and positive features of Bayview Hunters Point.

Policy 10.1 Better define Bayview's designated open space areas by enabling appropriate, quality development in surrounding areas.

Objective 11 Improve definition of the overall urban pattern of Bayview Hunters Point.

Policy 11.1 Recognize and enhance the distinctive features of Bayview Hunters Point as an interlocking system of diverse neighborhoods.

Refer to Section III.B (Land Use and Plans) for a full description of these policies and objectives.

San Francisco Bay Plan

The *San Francisco Bay Plan* contains policies and objectives designed to enhance the visual quality of development around the Bay, to enhance the pleasure of the viewer, and to take maximum advantage of the attractive setting it provides. The San Francisco Bay Plan contains policies regarding appearance, design, and scenic views, applicable to the Project as follows:

Policy 1 To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.

Policy 2 All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the (Planning) Commission's concerns, such as landscape architects, urban designers, or architects, working in conjunction with engineers and professionals in other fields.

Policy 3 In some areas, a small amount of fill may be allowed if the fill is necessary—and is the minimum absolutely required—to develop the project in accordance with the Commission's design recommendations.

Policy 4 Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.

Policy 6 Additional bridges over the Bay should be avoided, to the extent possible, to preserve the visual impact of the large expanse of the Bay. The design of new crossings deemed necessary should relate to others nearby and should be located between promontories or other land forms that naturally suggest themselves as connections

reaching across the Bay (but without destroying the obvious character of the promontory). New or remodeled bridges across the Bay should be designed to permit maximum viewing of the Bay and its surroundings by both motorist and pedestrians. Guardrails and bridge supports should be designed with views in mind.

Policy 8 Shoreline developments should be built in clusters, leaving open area around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be Bay-related and should be designed to preserve and enhance vies along the waterway, so as to provide maximum visual contact with the Bay.

Policy 9 "Unnatural" debris should be removed from sloughs, marshes, and mudflats that are retained as part of the ecological system. Sloughs marshes, and mudflats should be restored to their former natural state if they have been despoiled by human activities.

Policy 10 Towers, bridges, or other structures near or over the Bay should be designed as landmarks that suggest the location of the waterfront when it is not visible, especially in flat areas. But such landmarks should be low enough to assure the continued visual dominance of the hills around the Bay.

Policy 12 In order to achieve a high level of design quality, the Commission's Design Review Board, composed of design and planning professionals, should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay in accordance with the Bay Plan findings and policies on Public Access; on Appearance, Design, and Scenic Views; and the Public Access Design Guidelines. City, county, regional, state, and federal agencies should be guided in their evaluation of bayfront projects by the above guidelines.

Policy 14 Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).

Refer to Section III.B (Land Use and Plans) for a full description of these policies and objectives.

III.E.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to aesthetics, but generally consider that implementation of the Project would have significant impacts if it were to:

E.a Have a substantial adverse effect on a scenic vista

E.b Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting

E.c Substantially degrade the existing visual character or quality of the site and its surroundings

E.d Create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties

Analytic Method

Aesthetics in an urban setting is described by elements such as building scale, height, architectural features and materials, patterns of buildings along street frontages, and views of public open space or plazas or of more distant landscape features such as hills, the Bay, or built landmarks, such as bridges. In general, individual responses to aesthetics and changes in aesthetics are subjective. The analysis of visual impacts in this section focuses on the nature and magnitude of changes in the visual character of the Project site and identifies Project impacts on scenic views. This section also evaluates whether the Project would result in damage to scenic resources or substantially degrade the existing visual character or quality of the site, or result in impacts from increased light and glare.

Visual character refers to the aesthetic character or quality of a streetscape, building, group of buildings, or other manmade or natural feature that creates an overall impression of an area. The Project would be considered to degrade the existing visual character if it would result in substantial, demonstrable, negative aesthetic effects on a site or its surroundings. In this analysis, the discussion of visual character addresses the visual compatibility of the Project with surrounding land uses, as reflected by short- and mid-range views of the Project site.

Scenic vistas may be generally described as panoramic views of a large geographic area, for which the field of view can be wide, extend into the distance, and associated with vantage points that provide an orientation not commonly available. Examples of scenic vistas include urban skylines, valleys, mountain ranges, or large bodies of water. Significant impacts on a scenic vista would occur if the Project would substantially degrade or obstruct important scenic views from public areas. Scenic vistas are defined in the introduction to Impact AE-4, below.

Damage to scenic resources would occur if a project would directly affect environmental features, such as topographic features, landscaping, or a built landmark that contribute to a scenic public setting. In this analysis, scenic resources include the CPSRA, the Re-gunning crane, Yosemite Slough, the shoreline, the Bay, San Bruno Mountain, and Bayview Hill. Lastly, impacts from increased light and glare would be considered significant if they were to interfere with daytime or night views in the area or substantially impact other people or property.

To demonstrate the changes in visual character that would result with implementation of the Project, visual simulations of the Project from each of the viewpoints identified in Section III.E.2 (Setting) in Figure III.E-10 through Figure III.E-30 as well as other photographs contained in this section were used to evaluate changes in both views and visual character based on height, bulk, massing, and type of development when compared to existing conditions. Where appropriate, the simulations also include views of the approved HPS Phase I development, currently under construction, and the approved Visitacion Valley Redevelopment Plan. For the purpose of analyzing cumulative impacts, the simulations also include potential development under the proposed India Basin Shoreline Plan and the Executive Park Sub Area Plan.

The visual simulations are distinguished as long-range views (Figure III.E-11 through Figure III.E-18), and short- and mid-range (Figure III.E-19 through Figure III.E-30) depictions. The visual simulations include development with the Project and with other development noted, above. The analysis determines whether the Project would result in substantial blockage of or other substantial negative changes to existing views from the public viewpoints identified in Figure III.E-11 through Figure III.E-18, particularly to views of scenic open space and water, as well as whether the Project would result in degradation of the visual character or quality of the setting (refer to Figure III.E-19 through Figure III.E-30). The simulations are taken from fixed viewpoints and do not show all possible views of the Project site. For example, they do not provide the dynamic views that would be experienced while driving, walking, or cycling in the Project vicinity. In addition, the simulations depict the overall location, height, and dimension of development, with general exterior features or materials, window patterns, landscaping, or other details. The new buildings shown in views of Candlestick Point and HPS Phase II represent building types, heights, and dimensions that would reflect the Project land use plan and urban design guidelines. The simulations do not represent final architectural design that would occur with the Project. However, the simulations are sufficient for an adequate analysis of changes in scenic vistas, scenic resources, and visual character.

Construction Impacts

Impact AE-1: Effect on a Scenic Vista or Scenic Resources

Impact AE-1 **Construction activities associated with the Project would not have a substantial adverse effect on a scenic vista or scenic resources. (Less than Significant) *[Criteria E.a and E.b]***

- Construction activities would occur throughout the 702-acre Project site over the 20-year construction period of the Project (ending in 2031). During construction, four basic types of activities would be expected, and some activities could occur simultaneously.

Demolition of existing structures would occur. The site would be prepared, excavated, and graded to accommodate the new building foundations. Over-excavation and recompaction of near-surface soils would occur during grading to provide appropriate soil characteristics for the support of structures. The proposed development would then be constructed, including buildings, the stadium, parking structures, surface parking, and project-related infrastructure. New landscaping would also be planted around the new facilities and the development would be readied for use, including the application of architectural coatings and paving (although these two activities would not occur simultaneously).

Construction activities associated with infrastructure improvements would also occur on site and in areas adjacent to the Project site, such as at roadway intersections or to provide utility infrastructure. Specific activities would generally include demolition (scraping and/or cutting) of existing asphalt and concrete, grading to establish a new base for roadways, actual median and sidewalk elements, and replacement of signals and other infrastructure. In the case of water line and sewer connections, trenching would also be necessary to access the existing line to which the Project infrastructure would connect. Shoreline improvements would include grading in some areas, planting where appropriate, renovation of some existing shoreline structures, including addition of riprap, and removal of debris.

Construction workers and equipment would be parked and staged within the 702-acre Project construction site. Visual impacts associated with construction activities would include exposed pads and staging areas for grading, excavation, and construction equipment. In addition, temporary structures could be located in the Project site during various stages of demolition or construction, within materials storage areas, or associated with construction debris piles on and off site. Also, exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible for the proposed utilities and infrastructure improvements, as well as for roadway improvements.

Although these activities would take place primarily within the Project site, they would be visible to surrounding land uses. However, these visual conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Further, temporary conditions (e.g., bulldozers, trenching equipment, generators, trucks, etc.) associated with Project construction would not result in obstruction of a scenic vista, as construction equipment is not tall enough to interfere with views of the Bay, the East Bay hills, or the San Francisco downtown skyline. The only scenic or potential scenic resources on or near the Project site would be the Re-gunning crane, the CPSRA, and Yosemite Slough. There are no rock outcroppings or major areas of landscaping on the site, although some ruderal vegetation would be removed. Construction of the Project would not affect the Re-gunning crane, which would remain intact after implementation of the Project. The Project would retain structures at the identified Drydock Historic District. Construction of the Yosemite Slough bridge would change the appearance of the Slough as the bridge structure was constructed; however, this would not be considered a significant impact, as the overall view of the Slough would remain as a scenic resource. Therefore, construction activities would have a less-than-significant impact on scenic vistas and scenic resources. No mitigation is required.

Impact AE-2: Degradation of Visual Character or Quality

Impact AE-2 **Construction activities associated with the Project would not result in temporary degradation of the visual character or quality of the site. (Less than Significant with Mitigation) *[Criterion E.c]***

As previously stated, visual impacts associated with construction activities would include exposed pads and staging areas for grading, excavation, and construction equipment. In addition, temporary structures could be located on the Project site during various stages of construction, within materials storage areas, or associated with construction debris piles on site. Exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible during construction of the utility infrastructure improvements.

Although these activities would take place primarily on site, these visual impacts could affect surrounding land uses. Automobiles traveling along US-101, Harney Way, Arelious Walker Drive, Innes Avenue, and other streets in the immediate vicinity of the Project site would have short-term views of the Project site and adjacent street areas during construction activities and infrastructure improvements. Adverse visual impacts arising from construction activity would be temporary. Although the Project would be constructed through the year 2031, construction activity would not occur all at once and would be phased, as described Chapter II. Temporary screening of a particular construction or staging site (usually consisting of fabric screening stretched over temporary construction fencing) as required by mitigation measure MM AE-2 would serve to partially relieve the visual distractions typically associated with construction activities and commonly encountered in developed areas, particularly during excavation and foundation construction. Moreover, areas of construction would vary within the Project area such that areas of temporary visual distraction would change throughout the implementation phase of the Project.

Additional temporary visual impacts could occur from construction equipment traveling along local roadways and inadvertently depositing dirt and debris on the streets. Mitigation measure MM AE-2 would require the Applicant to stage all construction equipment on the Project site and to keep all construction equipment leaving the site free of mud. In addition, the Applicant would be required to sweep area streets of mud and debris caused by construction vehicles during the construction period.

The following mitigation measure shall be implemented:

MM AE-2 *Mitigation for Visual Character/Quality Impacts During Construction. Construction documents shall require all construction contractors to strictly control the staging of construction equipment and the cleanliness of construction equipment stored or driven beyond the limits of the construction work area. Construction equipment shall be parked and staged on the Project site. Staging areas shall be screened from view at street level with solid wood fencing or green fence. Prior to the issuance of building permits, the Applicant (through the construction contractor[s]) shall submit a construction staging, access, and parking plan to the San Francisco Department of Building Inspection for review and approval. On-street parking of construction worker vehicles shall be prohibited. Vehicles shall be kept clean and free of mud and dust before leaving the Project site. Project contractors shall be required to sweep surrounding streets used for construction access daily and maintain them free of dirt and debris.*

Mitigation measure MM AE-2, which would be incorporated as part of the Project's construction documents, would ensure that this impact is less than significant by requiring the Applicant to screen construction sites from public view at street level and provide for appropriate staging of construction equipment, keep the surrounding streets clean and free from construction debris, and maintain the cleanliness of construction equipment. Compliance with this mitigation measure would ensure that construction equipment would be confined to the Project site and ensure routine cleaning of construction equipment so mud and dirt are not spread onto adjacent streets when equipment exits the Project site to minimize adverse visual impacts from construction activities. This impact would, therefore, be considered less than significant.

Impact AE-3: Effect of Light or Glare on Day or Night Views

Impact AE-3 **Construction activities associated with the Project would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties. (Less than Significant) *[Criterion E.d]***

Construction would occur during daylight hours, generally between 7:00 A.M. and 8:00 P.M. or as otherwise allowed by the City (*San Francisco Police Code*, Article 29, Section 2908). A minimal amount of glare could result from reflection of sunlight off windows of trucks, but this would be negligible and would not affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the Project site, and would not exceed the level of existing night lighting levels in urban areas. Therefore, the Project's construction activities would have less-than-significant light and glare impacts. No mitigation is required.

Operational Impacts

Impact AE-4: Effects on Scenic Vistas

Scenic vistas, which have been defined as panoramic views of a large geographic area, for which the field of view can be wide, extend into the distance, and which are associated with vantage points that provide an orientation not commonly available, include views of the Bay, the East Bay hills, San Bruno Mountain, and the San Francisco downtown skyline, as well as views of the Re-gunning crane, Bayview Hill, the Yosemite Slough, and the CPSRA. Figure III.E-11 through Figure III.E-18 depict long-range scenic views from Twin Peaks, Bernal Heights, McLaren Park, Potrero Hill, the northbound US-101, San Bruno Mountain, and Oyster Point. Mid-range views would be views of about one-half mile; short-range views would be less than one-half mile to adjacent streets or viewpoints. The focus of this discussion is on impacts to scenic vistas/views across the Project site. Mid-range and short-range views (as illustrated on Figure III.E-19 through Figure III.E-30) are related to the visual character of the site, rather than scenic vistas, and are discussed in Impacts AE-6a, AE-6b, and AE-6, below. Impact AE-6 also discusses the relationship of the Project's proposed towers to the rest of the on-site development.

Impact AE-4 **Implementation of the Project would not have a substantial adverse effect on a scenic vista. (Less than Significant) *[Criterion E.a]***

View 1: Southeast from Twin Peaks (Figure III.E-11)

As shown in Figure III.E-11, the long-range view from Twin Peaks to the south and the Bay beyond would include residential towers at Candlestick Point between Hunters Point Hill and Bayview Hill. The towers, ranging from 240 feet to a maximum 420 feet in height, would replace distant views of existing Candlestick Park stadium, surrounding parking areas, and some views of CPSRA lands. The towers would appear relatively separated, with building heights descending from Bayview Hill to the east. The new 49ers stadium would be distantly visible at the HPS Phase II site, south of Hunters Point Hill, and beyond Bernal Heights. In this view, the stadium would partially block the existing distant view of the Re-gunning crane. Other approved projects would be seen in this view and the HPS Phase I development would be visible at the north end of the Shipyard. Although the Project would also be visible from this location, against the Bay

as a background, the Project would not substantially obstruct the views of the Bay or the East Bay hills. The Project would not substantially alter or degrade the scenic quality of the view, which already includes the urban setting of San Francisco as the foreground to the Bay. Bayview Hill, Hunters Point Hill, and Bernal Heights would continue as landmarks in this view.

View 2: Southeast from Bernal Heights (Figure III.E-12)

As shown in Figure III.E-12, the long-range view from Bernal Heights to the south and the Bay beyond would include residential towers at Candlestick Point, ranging from 240 feet to a maximum 420 feet in height, between Hunters Point Hill and Bayview Hill. The towers would replace distant views of existing Candlestick Park stadium, surrounding parking areas, and some views of CPSRA lands. The towers would appear relatively separated, with building heights descending from Bayview Hill to the east. The new 49ers stadium would be distantly visible at HPS Phase II, south of Hunters Point Hill. In this view, the stadium would partially block the existing distant view of the Re-gunning crane.

Although the Project would be visible from this location against San Francisco Bay as a background, the Project would not substantially obstruct the views of the Bay or the East Bay hills. The Project would not substantially alter or degrade the scenic quality of the view, as the view already includes the urban setting of San Francisco as the foreground to the Bay. Bayview Hill and Hunters Point Hill would continue as landmarks in this view.

View 3: East from McLaren Park (Figure III.E-13)

As shown in Figure III.E-13, from this location in McLaren Park, Bayview Hill would block most views of development at Candlestick Point; the upper stories of the residential towers would be distantly visible, but would not substantially change the existing views of the Bay and the East Bay hills. The upper stories of two towers at HPS Phase II would also be distantly visible. Other approved projects would be seen in the distance in this view and the HPS Phase I development would be distantly visible at the north end of the Shipyard.

Although the Project would be visible from this location against San Francisco Bay as a background, the Project would not substantially obstruct views of the Bay or the East Bay hills. The Project would not substantially alter or degrade the scenic quality of the view, as the view already includes the urban setting of San Francisco as the foreground to the Bay. Bayview Hill would continue as a landmark in this view.

View 4: South from Potrero Hill (Figure III.E-14)

As shown in Figure III.E-14, the long-range view from Potrero Hill to the south and the Bay beyond would include residential towers at Candlestick Point, ranging from 240 feet to a maximum 420 feet in height, between Hunters Point Hill and Bayview Hill. The towers would replace distant existing views of Candlestick Park stadium and surrounding parking areas. The towers would appear relatively separated, with building heights descending from Bayview Hill to the east. Development of HPS Phase II, including two towers, would be distantly visible east of Hunters Point Hill. The Project would be visible from this location, against San Francisco Bay as a background, and the residential towers at Candlestick Point would be a new built element between Bayview Hill and Hunters Point Hill. The views of the Bay or the East Bay hills would be partially blocked, but a substantial portion of the view would remain. HPS Phase II would also be a new element seen against the Bay and the East Bay hills.

The Project would not substantially alter or degrade the scenic quality of the view, as the view already includes the urban setting of San Francisco as the foreground to the Bay and East Bay hills. Bayview Hill and Hunters Point Hill would continue as landmarks in this view.

View 5: Northeast from Northbound US 101 (Figure III.E-15)

As shown in Figure III.E-15 from northbound US-101 south of the Project site, the Project would introduce high-rise structures that would be visible on the Candlestick Point portion of the site, ranging from 240 feet to a maximum 420 feet in height, with lower-scale development to the west. The high-rise buildings would be prominent, but would not obstruct views of Bayview Hill. The easterly towers in this view would be on land that was formerly part of the CPSRA. The shoreline of CPSRA would be visible as the foreground. Development of HPS Phase II would be visible to the east, including the new 49ers Stadium and the proposed marina, as would the approved HPS Phase I development that is currently under construction. Bayview Hill would continue as a landmark and the Bay would continue as foreground in this view.

Although the Project would be visible from this location, the Project would not substantially obstruct existing views of Bayview Hill and the Bay. The Project would not substantially alter or degrade the scenic quality of the view, for the same reason.

View 6: Northeast from US 101 at Harney Way Off-Ramp (Figure III.E-16)

As shown in Figure III.E-16, from northbound US-101, at Harney Way, the Project would introduce high-rise structures that would be visible on the Candlestick Point portion of the site, ranging from 240 feet to a maximum 420 feet in height, with lower-scale development to the west. The high-rise buildings would be prominent, but would not obstruct views of Bayview Hill. The easterly towers in this view would be on part of the land exchanged with the CPSRA. The shoreline of CPSRA would be visible as the foreground. Development of HPS Phase II, including the new 49ers Stadium, would be visible to the east. The proposed residential development at Executive Park (not a part of the Project), west of Candlestick Point, would be visible against the background of Bayview Hill. The Bay would continue to be visible in the foreground. Bayview Hill would continue as a key visual feature in this view.

Although the Project would be visible from this location, the Project would not substantially obstruct existing views of Bayview Hill and the Bay. The Project would not substantially alter or degrade the scenic quality of the view, for the same reason.

View 7: Northeast from San Bruno Mountain (Figure III.E-17)

As shown in Figure III.E-17, the view from the upper slopes of San Bruno Mountain provides a panoramic view of the Bay and the East Bay hills beyond. Public open space on San Bruno Mountain and on Bayview Hill is visible in the foreground, and existing residential and office development in the City of Brisbane and the Visitacion Valley neighborhood of San Francisco can be seen. The Project would introduce new structures, including high-rise buildings, ranging from 240 feet to a maximum 420 feet in height, at Candlestick Point, and the 49ers Stadium, new marina, and two towers, up to 240 feet to 370 feet high, at HPS Phase II. Some of the towers in this view would be on land that was formerly part of the CPSRA. From this viewpoint, the towers on Candlestick Point appear to cluster, and would block a portion of the view of the small area of water between Candlestick Point and Hunter Point. However, this obstruction is relatively small when compared to the sweeping panoramic view of the Bay that would still be held from

this viewpoint. The shoreline of CPSRA would be visible as the foreground. West of US-101, and development under the approved Visitacion Valley Redevelopment Plan would remain visible.

With the Project, the Candlestick Point area would appear more intensely urbanized. However, the Project would not substantially obstruct, alter or degrade the scenic quality of the view. The CPSRA shoreline and the Bay would continue as the foreground. The view of the Re-gunning crane would remain a key visual feature.

View 8: North from Oyster Point (Figure III.E-18)

As shown in Figure III.E-18, the view north from the Oyster Point peninsula in the City of South San Francisco provides a view of the Bay in the foreground, with Bayview Hill, Candlestick Point (including Candlestick Park stadium), and the Shipyard visible in the background. The East Bay hills are visible in the distance. Existing development in San Francisco west of Bayview Hill at Executive Park and on Hunters Point Hill is visible. The upper portions of structures in downtown San Francisco are visible to the east of Bayview Hill. The Project would introduce new structures, including high-rise buildings, ranging from 240 feet to a maximum 420 feet in height, at Candlestick Point. The easterly towers in this view would be on part of the land exchanged with the CPSRA. The shoreline of CPSRA would be visible in the foreground. The view includes the 49ers Stadium and other new structures at the Shipyard. To the north, the approved HPS Phase I development (not part of this Project), currently under construction, would be visible. West of US-101, development under the approved Visitacion Valley Redevelopment Plan would also be visible. The open space in the CPSRA would continue as the foreground.

Although the Project would be visible from this location, the Project would not substantially obstruct existing views of Bayview Hill and the Bay or the distant view of downtown San Francisco. The Project would not substantially alter or degrade the scenic quality of the view, for the same reason.

Other Views

Views of the Project site are also available from Alameda and Oakland, across the Bay. Daytime views of the site would change from a relatively low-level or vacant condition to more intense urban development. However, because of the intervening distance, individual characteristics of the Project site are not readily distinguishable to the naked eye, except Bayview Hill, Hunters Point Hill, and the Re-gunning crane, and these three visual features would not be disturbed by Project implementation. Views of Bayview Hill and Hunters Point Hill would be partially obstructed from Alameda and the Oakland area by Project structures; however, the obstruction would not be so great as to be considered to be significant. Views of the Bay and the CPSRA shoreline would remain. The Project would not obstruct or degrade the quality of views held from the East Bay.

Summary

As shown by Figure III.E-11 through Figure III.E-18 and the accompanying discussions, above, development of the Project would change views from public viewpoints, but would not substantially obstruct, alter, or degrade the quality of any scenic vistas. With development of Candlestick Point, residential towers would be predominant in the views from and to the north and would represent a substantial change in the existing low-scale pattern on the site. The scale of development would be similar to other areas of San Francisco, such as parts of downtown or Rincon Hill. The existing low-rise structures and open space (including parking lots) would be replaced with development of varying heights, but none

of the new development would substantially obstruct existing long-range views across the site. Views of the Bay and the CPSRA shoreline would remain. Project development at Jamestown would have maximum heights of 65 and 85 feet, below the crest of Bayview Hill, and would not substantially obstruct, alter, or degrade the quality of views of Bayview Hill.

Overall, development of the Project would not block publicly accessible views of the Bay or other scenic vistas. The Project would provide a continuation of the existing street grid, thereby maintaining existing view corridors to the Bay and East Bay hills. Public access areas, both City and State parks, would maintain views from the Project site toward the East Bay and the Bay. While development of the Project would include several high-rise towers, these towers are not clustered, and would not substantially obstruct, alter, or degrade the quality of views of the Bay or beyond from any long-range viewpoints. Views of Bayview Hill and Hunters Point Hill from the East Bay would be partially obstructed from Alameda and the Oakland area by Project structures; however, the amount of the obstruction would be minimal and not considered to be significant because of the distance across the Bay. Project development would not obstruct, alter, or degrade the quality of any existing views of the site from these locations.

The Project would be consistent with General Plan policies that promote enhanced access to the San Francisco Bay shoreline, a distinctive feature at the Candlestick Point site, and protect major views of open space and water by providing expanses of open space that preserve these views as well as providing increased connectivity to the shoreline. As the Project would not substantially obstruct any scenic vistas, this impact would be less than significant. No mitigation is required.

Impact AE-5: Effects on Scenic Resources

Impact of Candlestick Point

Impact AE-5a **Implementation of the Project at Candlestick Point would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting. (Less than Significant)** ***[Criterion E.b]***

As shown by the various photographs and simulations depicted in Figure III.E-2 through Figure III.E-9, and Figure III.E-11 through Figure III.E-18, development at Candlestick Point would include redevelopment of Candlestick Park stadium and associated paved and unpaved parking lots by replacing degraded urban areas and outdated residential development with new, well-designed urban development and with integrated public parks. The Project would include new housing and replacement of existing housing on undeveloped parcels on the Alice Griffith Public Housing site and remove other existing uses, such as the Candlestick RV Park. Most of these sites include ruderal vegetation and little landscaping, and are visually unappealing or degraded.

The Project proposes a reconfiguration of CPSRA, coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The CPSRA would be improved on 91 acres, increased by 5.7 new acres, and reduced by net 23.5 acres on Candlestick Point. (refer to Figure II-8 [Existing and Approved Parks and Open Space] and Figure II-9 [Proposed Parks and Open Space] in Chapter II). The acres to be removed include CPSRA land primarily in gravel and paved areas, leased for parking at Candlestick Park stadium, and some acreage in non-native vegetation

contiguous with other open space at the CPSRA. (Figure III.E-5A and Figure III.E-5B illustrate existing conditions, including paved areas and typical vegetation conditions found in other areas of the CPSRA.) Removal of the parking areas at the CPSRA would not be an adverse effect on a scenic resource, because 91 acres of the CPSRA would be improved. Removal of other planted CPSRA areas would reduce the open space between the new development in Candlestick Point and the CPSRA shoreline, compared to the current boundaries of the CPSRA. However, other CPSRA areas would be maintained or improved. The CPSRA would continue as publicly accessible shoreline around Candlestick Point. Because of the improvements planned for the CPSRA under the Project, the loss of all or a part of the degraded portion of the CPSRA would not substantially damage a resource that contributes to a scenic public setting.

- The Yosemite Slough bridge would change the appearance of a portion of the slough, with the addition of a bridge structure and roadway approaches (refer to Figure III.E-8). The bridge would replace some views of open water as seen from nearby locations. The bridge would contain "green" auto lanes, with plantings in the middle providing a green boardwalk. The bridge would be low profile and integrated into the open space on either side of the slough, and would contain piers and lookout points for a pedestrian viewing experience. Yosemite Slough would continue as a waterway bordered by open space opening from a narrow channel to the west to the wider South Basin to the east and would remain a scenic resource on the site. The Project would complete the Bay Trail along the waterfront, make shoreline improvements, and provide substantial areas of parks and open space that would complement the slough restoration. The Project's proposed roadway and bridge through an otherwise entirely recreational open space area would have some adverse impact on the aesthetic experience, when compared to a natural open space area with no roadway or bridge running through it. The introduction of a roadway and bridge, together with activity on and use of those features, would adversely affect the natural feel of this portion of the park. Nevertheless, the EIR does not consider the proposed roadway and bridge to result in a significant adverse impact on the proposed improved recreation area for a variety of reasons. The slough is presently, and would continue to be, located within an urban environment, bordered in part by developed lots and roads. Hence, even without the proposed roadway and bridge, park users would be aware of and in close proximity to the roads and developed areas bordering the park. While the proposed road and bridge would cut through the open space in one location, the majority of the restored slough area would remain unaffected and available for its intended use. In addition, the proposed road and bridge would provide some benefits to the restored park in terms of access and new vantage points for views. Overall, the bridge would not substantially damage a resource that contributes to a scenic public setting.

The proposed shoreline improvements would improve the aesthetic quality of the shoreline along Candlestick Point, reducing erosion, including marsh plantings where appropriate, and removing debris. These improvements would represent a beneficial impact of the development, improving the overall visual character of the shoreline.

Therefore, Project development at Candlestick Point would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting and the impact would be less than significant. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact AE-5b **Implementation of the Project at HPS Phase II would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting. (Less than Significant)** ***[Criterion E.b]***

As shown by the various photographs and simulations depicted in Figure III.E-2 through Figure III.E-9, and Figure III.E-11 through Figure III.E-18, the Project would include redevelopment of HPS and would remove old, deteriorating structures associated with ship repair, piers, dry-docks, storage, and administrative uses.

Currently, HPS contains limited landscaping and is primarily a degraded industrial setting. Hunters Point Hill is a prominent scenic resource west of the HPS Phase II site and would remain intact with Project development. Views of Bayview Hill would not be significantly obstructed by Project development in HPS Phase II except from close-in vantage points. The Project would demolish Building 253, a highly visible structure, but this structure is not identified as a scenic resource, even though some viewers might use the building as a visual orientation. The Project would retain structures at the potential HPS Drydock Historic District, as well as the Re-gunning crane, a highly visible feature. Development of the HPS Phase II site would also include about 240 acres of new and renovated parkland with improved public access, thereby improving the scenic quality of the area. The proposed shoreline improvements and construction of the new marina would improve the aesthetic quality of the shoreline along HPS Phase II, reducing erosion, including marsh plantings where appropriate, and removing debris. These improvements would represent a beneficial impact of the development, improving the overall visual character of the shoreline. The Project would complete the Bay Trail along the waterfront and provide substantial areas of parks and open space that would complement the slough restoration. While the Yosemite Slough bridge would alter the visual character of the slough by placing a structure across the neck of the slough, this change would not be substantially adverse. The bridge would be designed to be low in height and blend as much as possible into the environment through the use of openwork, materials, and color. The Project's proposed roadway and bridge through an otherwise entirely recreational open space area would have some adverse impact on the aesthetic experience, when compared to a natural open space area with no roadway or bridge running through it. The introduction of a roadway and bridge, together with activity on and use of those features, would adversely affect the natural feel of this portion of the park. Nevertheless, the EIR does not consider the proposed roadway and bridge to result in a significant adverse impact on the proposed improved recreation area for a variety of reasons. The slough is presently, and would continue to be, located within an urban environment, bordered in part by developed lots and roads. Hence, even without the proposed roadway and bridge, park users would be aware of and in close proximity to the roads and developed areas bordering the park. While the proposed road and bridge would cut through the open space in one location, the majority of the restored slough area would remain unaffected and available for its intended use. In addition, the proposed road and bridge would provide some benefits to the restored park in terms of access and new vantage points for views. Therefore, development at the HPS Phase II site would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting, and the impact would be less than significant. No mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact AE-5 **Implementation of the Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting. (Less than Significant) *[Criterion E.b]***

As shown by the various photographs and simulations and the discussions provided in Impact AE-5(a) and Impact AE-5b, above, development of the Project would not damage or remove any identified scenic resources that contribute to a scenic public setting. The Project would complete the Bay Trail along the waterfront and provide substantial areas of parks and open space. While the Yosemite Slough bridge would alter the visual character of the slough by placing a structure across the neck of the slough, this change would not be substantially adverse. The bridge would be designed to be low in height and blend as much as possible into the environment through the use of openwork, materials, and color. The change would not be considered adverse, as the bridge would be part of an overall urban setting on either side of the slough. The Project's impact would be less than significant. No mitigation is required.

Impact AE-6: Effects on Visual Character

For the purposes of the analysis of the Project's potential to substantially degrade the existing visual character of the site and its surroundings, Figure III.E-19 through Figure III.E-30 illustrate mid- and short-range views of the Project site from various vantage points. These figures depict the before-and-after conditions with regard to the visual character of the Project site. The impact analysis is structured to convey the before and after conditions represented by the visual simulations. However, in addition, refer to Figure III.E-2 through Figure III.E-9 for photographs of existing conditions on the Project site and surrounding neighborhoods. It should be noted that these figures do not include already approved development, including HPS Phase I (not part of the Project), which would increase the amount of development even more compared to that depicted in the photographs. The discussion provided in the analysis of the Project's consistency with the Urban Design Element of the City's General Plan supplements this impact analysis by providing a narrative discussion of visual character of each of the Project's districts with respect to design patterns, connectivity, neighborhood image, and visual compatibility with existing development.

Impact of Candlestick Point

Impact AE-6a **Implementation of the Project at Candlestick Point would not substantially degrade the existing visual character or quality of the site or its surroundings. (Less than Significant) *[Criterion E.c]***

View 9: North from CPSRA South of Harney Way (Figure III.E-19)

Figure III.E-19 represents a short-range view from CPSRA towards Candlestick Park stadium, the upper sections of which are visible. The planted areas in the foreground are within the CPSRA. With the Project, Candlestick Park stadium would be demolished and residential towers would be visible to the east of the stadium site. Existing CPSRA planting would limit views of other new Candlestick Park structures from this location in the CPSRA. Short- and mid-range views of the stadium would be replaced with Project development and landscaping. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 10: Northeast from Bayview Hill (Figure III.E-20)

As shown in Figure III.E-20, the view from public open space on Bayview Hill, between existing trees in the foreground, includes Jamestown Avenue at the base of the Bayview Hill, areas south of Yosemite Slough within the CPSRA, currently operated as parking for Candlestick Park stadium, and, north of the Slough, the Shipyard and the approved HPS Phase I development area. From this location, residential uses on Jamestown Avenue, and, with the proposed CPSRA land agreement relative to sites south of the Slough, would be visible in the foreground, replacing views of paved parking lots. Shoreline open space would be developed north of the residential uses. To the east, residential towers at Candlestick Point would be visible. The view would include improved Arelious Walker Drive leading to the Yosemite Slough bridge, which is proposed as a Bus Rapid Transit (BRT), pedestrian and bicycle route, and a vehicle route on game days at the new stadium. North of Yosemite Slough proposed open space at the Shipyard would front the shoreline. Other Shipyard development would be visible beyond the open space. To the north, the approved HPS Phase I development (not part of the Project), currently under construction, would be visible. West of the proposed bridge, the view would include restored open space at the CPSRA. Short- and mid-range views of degraded and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 11: Northwest from CPSRA (Figure III.E-21)

Figure III.E-21, from the easterly area of CPSRA, includes an expanse of the Bay, Bayview Hill, and Candlestick Point stadium. The Project would introduce residential towers and other structures at Candlestick Point, as seen beyond the shoreline of the CPSRA, and would obstruct the view of portions of Bayview Hill. West of Candlestick Point, existing and approved residential development at Executive Park would be visible.

The Candlestick Point towers, ranging from 240 feet to a maximum 420 feet in height, would be a substantial change in the existing low-scale pattern in this view, and would block distant views of neighborhoods to the north. The shoreline of CPSRA would be visible as the foreground.

Views of the Bay and the CPSRA shoreline and partial views of Bayview Hill would remain. The scale of development would be similar to other areas of San Francisco, such as parts of downtown, or Rincon Hill. The Project would replace deteriorating structures, vacant parcels, expanses of asphalt and dirt, and piles of rubble and debris with a high-quality environment that would include a variety of architectural styles and open space. Short- and mid-range views of degraded and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 12: Southeast from Gilman Avenue (Figure III.E-22)

Figure III.E-22 shows the residential streetscape on Gilman Avenue looking southeast toward the Project site. The Project would introduce mid- and high-rise buildings up to 320 feet in height visible in the distance at Candlestick Point. The Project would include roadway and streetscape improvements, also illustrated in Figure III.E-22. Short- and mid-range views of degraded and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 13: West from CPSRA (Figure III.E-23)

Figure III.E-23 shows a view of an open expanse of unpaved parking area looking west from the CPSRA toward the Alice Griffith Public Housing site, with residential uses and Bayview Hill beyond. The existing Alice Griffith Public Housing is seen to the west. The foreground parking area is within the CPSRA and is currently operated as parking for Candlestick Park stadium. The Alice Griffith Public Housing site would be redeveloped and would be visible from this location, replacing views of parking lots and other undeveloped areas (with the proposed CPSRA land agreement). The Project would include improvement of CPSRA lands remaining at this location, as conceptually illustrated in Figure III.E-23. The Alice Griffith redevelopment, with buildings up to 65 feet high, would limit the views of Bayview Hill and existing residential development. Short- and mid-range views of degraded and unmaintained areas and older residential development would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 14: Southeast from CPSRA (Figure III.E-24)

Figure III.E-24 shows grasslands of the CPSRA and Yosemite Slough in the foreground, with shipyard structures in the background, from a location on CPSRA outside the Project site looking northeast. The East Bay hills are visible in the long-range view. The Project would introduce new structures at HPS Phase II, including the 49ers Stadium and residential towers up to 370 feet. The Yosemite Slough bridge would be visible, crossing from Candlestick Point to the Shipyard, as well as the new marina. Figure III.E-24 also illustrates potential landscaping along roadways at the Shipyard. To the north, the approved HPS Phase I development (not part of the Project), currently under construction, would be visible. The new structures would not obstruct existing views of the distant East Bay hills. The Yosemite Slough bridge would limit some foreground views of the Slough; however, overall views of the Bay would remain. Short- and mid-range views of the Slough would be somewhat altered with the inclusion of the proposed bridge. However, short- and mid-range views of the remainder of the Slough would remain as under current conditions. Building 253, a prominent visual feature in this view, would be demolished with the Project. Building 253 does not make a substantial contribution to the public scenic setting, and would not be considered an individual scenic resource. The Re-gunning crane would remain prominent in this view. The Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 15: Southeast from Palou Avenue (Figure III.E-25)

Figure III.E-25 shows the residential streetscape on Palou Avenue near Ingalls Street, looking southeast toward the Shipyard. There are distant views of the Bay and the East Bay hills. With the Project, a part of the 49ers Stadium would be visible in the distance. Figure III.E-25 illustrates streetscape improvements proposed on Palou Avenue, including parking, bicycle lanes, pavement treatments, and street trees, and would be considered to improve the visual character of the Palou corridor. Only a small portion of the Project development would be visible at the end of this view, which would not substantially obstruct, alter, or otherwise degrade the existing visual character or quality of the site or its surroundings.

View 16: Southwest from Mariner Village (Figure III.E-26)

Figure III.E-26 shows a view south from Mariner Village on LaSalle Avenue on Hunters Point Hill. The foreground includes undeveloped areas of the Shipyard south of Crisp Road. The existing buildings south

of Crisp are UCSF facilities that are not part of the HPS Phase II site. South Basin, CPSRA, residential development at the base of Bayview Hill, and Candlestick Park stadium are visible to the south. The Bay shoreline and San Bruno Mountain are in the background.

With the Project, Candlestick Point towers, ranging from 240 feet to a maximum 420 feet in height, would be a substantial change in the existing low-scale pattern in this view. The shoreline of CPSRA would be visible as the foreground. Other Candlestick Park development would be visible to the north and on Jamestown Avenue at the base of Bayview Hill. The view would also include the Yosemite Slough bridge, improved open space at HPS Phase II, and buildings on Crisp Road. Mid-range views of degraded and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

Other Views

Views of the Project site are also held from Alameda and Oakland, across the Bay. Daytime views of the site would change from a relatively low-level or vacant condition to more intense urban development. However, because of the intervening distance, individual characteristics of the Project site are not readily distinguishable to the naked eye, except Bayview Hill, Hunters Point Hill, and the Re-gunning crane, and these three site features would not be disturbed by Project implementation. The increased density of development as a result of the Project would be consistent with the pattern of development in San Francisco, even along the shoreline. The scale of development would be similar to other areas of San Francisco, such as parts of downtown, or Rincon Hill. While the Project would change the character of the site, it would not be considered a significant adverse change in the visual character of the setting.

Summary

Under current conditions, Bayview Hill, Candlestick Park, residential buildings up to five stories, and three- to eight-story commercial structures are visible from mid-range viewpoints. As shown by the various photographs and simulations and the accompanying discussions, above, development at Candlestick Point, including the residential towers ranging from 240 feet to 420 feet in height, would change the visual character of the Project site. Some of these towers would be similar to the height of Bayview Hill. Candlestick Park stadium would be demolished and buildings ranging from 40 feet to 420 feet would occupy the site.

Although the Project would change the visual character of the site, it would be designed to be compatible with existing neighborhoods. New uses would be consistent with other development occurring in the Project vicinity. For example, development at Candlestick Point would be similar in character to the proposed mixed-use commercial and high-density residential development at Executive Park and development along Jamestown Avenue. Project buildings proposed on Jamestown Avenue would be approximately three stories tall and would be similar in scale to structures in the Jamestown and Candlestick Point South districts. Development would be compatible with the type, scale, and form of nearby land uses in the Bayview Hunters Point neighborhood. Although residential densities in the Alice Griffith Public Housing district would be higher than the density of existing off-site residential uses to the west and south, there would be a gradual transition in density and massing from existing to proposed uses. Future building heights would be limited to 65 feet, and building façades would feature articulated massing that would feature vertical and horizontal setbacks to break up the mass of the building and minimize view obstruction

from comparably smaller buildings. The Project would transition from existing adjoining neighborhoods primarily through the use of building scale and compatibility of uses, providing the lowest building height at existing neighborhood edges, stepping up in height as one travels into the development.

Future uses in the Candlestick Point North district would include residential uses, although densities would be higher, ranging from 50 to 175 units per net acre. The Candlestick Point North district would contain up to three residential towers with heights of up to 270 feet. This district, which would include some of the tallest proposed structures at Candlestick Point, would be separated from existing off-site residential uses by the Alice Griffith district. Lower-density uses at Alice Griffith would provide a transition between existing development and the high-density residential uses in this district. The towers would be spaced to preserve views and a sense of openness from existing residential areas. Therefore, the heights and massing of the proposed towers would not overwhelm existing uses.

The Jamestown district would include two-story townhomes and low-rise flats, similar to existing two-story and three-story units currently being constructed to the west, also on Jamestown Avenue. Maximum heights would range from 65 feet (about five stories) at the north end of the district to 85 feet (about six stories) at the south end. Thus, the proposed development in this district would be similar in scale and type to the surrounding land use pattern of multi-family development.

Candlestick Point Center would include 275 residential units at 15 to 75 units per net acre along the perimeter of the blocks, above base floors containing commercial uses and parking areas. The 150,000 gsf, 220-room hotel would be at the western edge of the district. Candlestick Point Center would include buildings up to 65 and 85 feet in height. Parking structures would be interior to blocks and consist of up to four floors, including up to one sub-grade level.

These uses would generally be compatible with moderate- and high-density residential uses. Parking along Arelious Walker Street would provide a large setback between the Candlestick Point Center district and existing uses on Bayview Hill.

The Candlestick Point South district would include residential uses similar in scale to uses proposed in the Alice Griffith Public Housing district, with the exception of residential towers, with heights generally limited to 65 feet (five to seven stories tall). Two residential towers on the south half of this district would have maximum heights of up to 370 feet (approximately 40 stories) and one tower on the south end of the district would have a maximum height of 420 feet (approximately 42 stories). The north half of the district would have five residential towers, one with maximum height up to 220 feet, two with maximum heights up to 270 feet and two with maximum heights up to 320 feet. This area would not be adjacent to any existing adjacent neighborhoods. The scale and type of development in this area would be designed to be compatible with the reconfigured CPSRA, along the shoreline of Candlestick Point. A row of townhomes two blocks deep would line the open space area along the San Francisco Bay. Thus, building scale would be moderate and would provide a gradual transition between the open space area and the denser core of the site.

The BVHP neighborhood to the northeast of Candlestick Point is characterized by two-story, single-family row houses and some taller multi-family structures of various architectural styles, fronting relatively wide streets. Development at the Alice Griffith Public Housing site would have a similar land use as adjoining areas. The taller and higher density uses would be sited at a greater distance from the lower scale neighborhood to the north. Public open space within Candlestick Point districts would be a visual amenity,

and would connect to existing and reconfigured open space at CPSRA. Larger-scale uses at the regional retail center and the arena would be located near the current site of Candlestick Park stadium, an existing large structure. The new street grid would extend the existing block pattern of the BVHP neighborhood, and would include streetscape features such as street trees, sidewalk plantings, furnishing, and paving treatments.

The Yosemite Slough bridge would change the open water character along the bridge route across a relatively narrow portion of the Slough. This would not be considered a substantial adverse change in the overall visual character of Yosemite Slough, as the bridge would occupy only a small footprint relative to the entire Slough. The remainder of the Slough would remain visible as an open area.

The Project would alter the scenic nature of the Project site in that it would create a dense urbanized setting where one does not currently exist. On the north side, the bridge would cross the extreme eastern edge of the CPSRA area and would cross a small portion of the CPSRA on the south side. The bridge would be designed to integrate with the environment to the maximum extent feasible through openwork, materials, and color, in addition to being designed as a low structure. While the bridge would insert a structure into an improved open space area, it would connect two urbanized areas immediately adjacent. Taking into consideration the context of the entire site, not just the slough, the bridge would not be an element that is substantially out of character or scale with surrounding development. Therefore, this change in character would not represent a degradation of scenic quality. Tall Project structures would be located so that views of sky, topography, the Bay, and shoreline would be maintained. The towers are designed to create a scenic skyline, with the tallest towers toward the center of the development. The composition of the towers would be shaped into a pyramid form to shape the skyline. Key gateways would have taller, more distinct profiles, and important views and open spaces would be around and shaped by the towers.

The Project would replace degraded urban areas, vacant parcels, expanses of asphalt and dirt, and outdated residential development with new, well-designed urban development. The Project would improve the existing quality of the site by providing new areas of open space, enhanced connectivity to the shoreline, and pedestrian amenities such as outdoor plazas, walking paths, outdoor eating areas, sidewalks, street-side landscapes, and improved lighting. Urban design policies would ensure that there is appropriate transition from the existing neighborhoods to the Project's new neighborhoods. Therefore, the Project would not substantially degrade the visual character or quality of the Candlestick Point area or its surroundings. The Project would improve the visual quality of the Candlestick Point area, which contains vacant properties, expanses of parking lot, deteriorated structures, and piles of rubble. Therefore, the Project's overall impact on visual character at Candlestick Point would be less than significant. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact AE-6b **Implementation of the Project at HPS Phase II would not substantially degrade the visual character or quality of the site or its surroundings. (Less than Significant) *[Criterion E.a]***

View 17: Northeast from CPSRA (Figure III.E-27)

Figure III.E-27, from the easterly area of CPSRA looking northeast to the Shipyard, includes the Bay in the foreground and existing buildings at the Shipyard. Views of Project development at the Shipyard would include 49ers Stadium, the new marina, and Research & Development buildings. A residential tower, up to

370 feet in height, would be visible beyond the stadium. The Re-gunning crane would continue as a highly visible landmark, although Building 253, also a prominent structural feature, would be demolished. However, Building 253 is not considered a scenic resource, as noted, above, and its removal would not substantially degrade the existing visual character of the site. To the north, the approved HPS Phase I development, not part of the Project and currently under construction, would be visible. Mid-range views of degraded, vacant, and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 18: South from Hilltop Open Space (Figure III.E-28)

Figure III.E-28 shows a view from hilltop open space to be completed as part of HPS Phase I (not a part of this Project). Existing structures are visible in the mid-ground, with the Re-gunning crane prominent to the south. The Bay and the Santa Cruz Mountains on the San Francisco Peninsula are in the distance.

With the Project, this view would include the 49ers Stadium, and surrounding parking areas and dual-use playfields, serving as parking during stadium events. During football events, the parking area and dual-use fields seen from the open space would be generally filled with vehicles. The new stadium would be taller than the existing structures. The stadium would partially obstruct the long-range view of the Santa Cruz Mountains. The waterfront area near the Re-gunning crane would become a recreation area. The view of the Re-gunning crane would continue as a landmark and the new marina would be visible. Mid-range views of degraded and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 19: East from Hunters Point Hill Open Space (Figure III.E-29)

Figure III.E-29 shows a view from open space on Northridge Road on Hunters Point Hill towards the Project looking southeast Structures and cleared areas at HPS Phase I are visible. The Project would replace the existing structures in the mid ground with mid-rise and two residential towers, up to 370 feet in height. New open space at the Shipyard would be visible at the base of the hill. To the south, the approved HPS Phase I development, not part of the Project and currently under construction, would be visible. Mid-range views of degraded and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

View 20: Southeast from Heron's Head Park (Figure III.E-30)

Figure III.E-30 shows a view from Heron's Head Park, north of India Basin, towards the Shipyard. This view includes wetlands at Heron's Head Park, Shipyard structures in the middle ground, and long-range views of the Bay and the East Bay hills. The Project would replace existing development on HPS with new low-, mid-, and high-rise development up to 370 feet in height. The approved HPS Phase I development, not part of the Project and currently under construction, would be visible above India Basin. Building 253, a structural landmark in this view, would be demolished; however, the Re-gunning crane would remain as a landmark in this view. Building 253 is not considered a scenic resource, as noted, above, and its removal would not substantially degrade the existing visual character of the site. Mid-range views of degraded, vacant, and unmaintained areas would be replaced with well-designed development. Therefore, the Project would not substantially degrade the existing visual character or quality of the site or its surroundings.

Summary

As shown by the various photographs and simulations, the Project would alter the visual character at HPS Phase II, with new development of residential uses, R&D, neighborhood retail, the 49ers Stadium, and parking facilities, including dual-use parking and athletic fields, and other public open space. The Project would demolish all existing industrial structures at the Shipyard, with the exception of the potential HPS Drydock Historic District and the Re-gunning Crane. The Project would extend a street grid and block pattern into the HPS Phase II North, Village Center, and R&D districts. The Project would include an open space network from India Basin to the north along the waterfront to Yosemite Slough, and open space proposed to be added to the CPSRA as part of the land agreement. HPS Phase II would also include a new marina.

The proposed HPS Phase II development would be compatible with the type, scale, form, and location of nearby land uses in the Bayview Hunters Point neighborhood. The Project would include Redevelopment Plan documents that would specify development standards for setbacks, heights, massing, hillside development, and other building features at HPS Phase II. These standards would prevent juxtaposition of incompatible uses, ensure a gradual transition of density and bulk, and provide connectivity between existing and proposed uses and between each of the districts.

Design elements would enhance the identity of the Project districts. This would be accomplished through visual elements, such as compatible architectural styles, that would provide a transition from existing development into the Project. Other elements would be included to create a distinct sense of place, such as landscaping, transit shelters, street trees, sidewalk plantings, and pedestrian amenities, such as outdoor eating areas, plazas, and seating areas. Street-side plantings and distinctive pavement treatments would be extensive throughout the Project and designed to enhance building architecture and emphasize public and commercial areas. Continuous and well-appointed shop windows and arcades would be designed to act as invitations to movement and providing human scale at lower levels through use of texture and details. Parks and open space areas would be extensively landscaped to provide a visually pleasing recreational experience.

Uses in the HPS Phase II North district would generally consist of residential uses, ranging from densities of 15 to 175 units per net acre, with maximum heights ranging from 35 to 85 feet. Moderate-density townhomes and apartment blocks, with maximum heights ranging from 40 to 65 feet (three to seven stories tall), would line a proposed open space corridor along the San Francisco Bay shoreline. These uses would be adjacent to, and similar in scale and character, to adjacent residential uses at the HPS Phase I site, which would have heights ranging from 35 to 65 feet (three to six stories). One residential tower with a maximum height up to 370 feet (approximately 40 stories) would be at the southeast corner of the HPS Phase II North district, adjacent to the Village Center district. That tower would have approximately 15,000 gsf of neighborhood retail uses on the lower floors, continuing the neighborhood retail pattern in the Village Center district. While this tower would be taller than adjacent development, the uses it would contain—neighborhood retail—would be consistent with adjacent retail and residential land uses.

The HPS Phase II Village Center district would include neighborhood retail and upper-story residential units in five-story buildings. New buildings would have height limits of up to 65 feet (up to seven stories tall). Those uses would be similar in type and scale to surrounding mixed-use and residential development at the adjacent HPS Phase I. Building heights and massing would be similar, and uses would gradually

transition from residential uses in the HPS Phase II Village Center to mixed residential and commercial/Research & Development (R&D) uses in the HPS Phase II and R&D districts.

Uses in the R&D district would have a small area of mixed residential and neighborhood retail uses bordering on the HPS Phase II North district to the north, which, as stated above, would contain residential buildings ranging from three to eight stories tall, and the HPS Phase II Center district to the west, which would contain mixed retail and residential uses. Structures in the center of this district would range from 85 to 105 feet tall. The R&D district would not be adjacent to existing developed land uses.

The HPS Phase II South district would contain a new 69,000-seat 49ers stadium, as well as dual-use fields that would serve as stadium parking and athletic fields. The top row of stadium seating would be at an elevation of approximately 156 feet (about 15 stories) above the playing field. This would be similar to the scale of the existing Candlestick Park stadium. While the stadium site would be substantially changed with the Project, the stadium site would include landscaping and open space/turf areas and, therefore, would represent an improvement over the existing stadium. The change from an industrial appearance to a stadium use would not be considered adverse. The HPS Phase II South district would be surrounded by new open space to the west, south, and east, and by new R&D uses to the north, replacing waterfront industrial facilities and vacant lots. With respect to adjacent neighborhoods, the HPS Phase II North district would be south of the mixed-use India Basin neighborhood.

The HPS Phase II North district, near existing neighborhoods of India Basin, Hunters Point Hill, and HPS Phase I, would provide a new residential area with buildings heights up to 65 feet. Proposed open space would also separate HPS Phase II North from India Basin. Up to two residential towers in HPS Phase II Village Center would range from 220 feet to 270 feet in height. The R&D uses would range from 65 feet to 105 feet in height.

Public open space within HPS Phase II would be a visual amenity and would connect to reconfigured open space at CPSRA. The new street grid would include streetscape features such as street trees, sidewalk plantings, furnishing, and paving treatments.

As identified in the BVHP Area Plan (of the City's General Plan), there are a number of somewhat incompatible existing uses adjacent or in close proximity to one another at the eastern edge of the Project site, including the Yosemite Canal, the CPSRA, Bayview residential neighborhoods, the Alice Griffith Public Housing site, industrial uses, and the Candlestick Park stadium. The Project has been designed to remove most of these conflicts and to provide for a walkable, pedestrian-friendly community of compatible uses. Height, massing, and setback restrictions at the areas where the new development would connect with existing development would provide for a transition zone that would maximize compatibility with existing uses. Residents of existing neighborhoods would be directly connected to the new development and would be anticipated to utilize the Project's commercial and open space uses. The architecture of the new stadium would be designed to be visually pleasing and landscaping would be utilized to help soften the structure's appearance. Relocating the stadium, redeveloping vacant and underutilized parcels, and removing the deteriorating conditions on the Project site would eliminate the incompatibility of the existing industrial and residential uses. The new stadium would be placed on the site in a more compatible location than the existing stadium, located adjacent to large open space areas and away from residential uses.

The BVHP Redevelopment Plan seeks to alleviate blight throughout the Project area and promote inclusion of affordable housing, economic development, and community enhancements. The Project would revitalize and redevelop deteriorated, vacant, and underutilized parcels into a vibrant, connected complex of districts that would connect to each other and to existing area neighborhoods. Heights and massing of Project structures that are adjacent to existing neighborhoods would be limited to provide a pleasing visual transition from the existing neighborhoods through the Project by concentrating taller and more massive structures nearer the interior of the Project site. The project would provide extensive areas of open space integrated with new development and existing open space that would enhance the positive features of Bayview Hunters Point, with its immediate proximity to the shoreline, and would not substantially obstruct views of the Bay, the East Bay hills, and the San Bruno Mountains from adjacent neighborhoods. Overall, the Project would improve the visual appearance of the Project site by removing deteriorated conditions and replacing them with vibrant, mixed uses that would enhance neighborhood connectivity and access to the shoreline and provide neighborhood- and regional-serving amenities. The existing street grid would be extended and expanded, preserving the overall urban pattern of Bayview Hunters Point.

- The Project would alter the scenic nature of the Project site in that it would create a dense urbanized setting where one does not currently exist. On the north side, the bridge would cross the extreme eastern edge of the CPSRA area and would cross a small portion of the CPSRA on the south side. The bridge would be designed to integrate with the environment to the maximum extent feasible through openwork, materials, and color, in addition to being designed as a low structure. While the bridge would insert a structure into an improved open space area, it would connect two urbanized areas immediately adjacent. Taking into consideration the context of the entire site, not just the slough, the bridge would not be an element that is out of character or scale with surrounding development. Therefore, this change in character would not represent a substantial degradation of scenic quality.

The Project would replace deteriorating structures, vacant parcels, expanses of asphalt and dirt, and piles of rubble and debris with a high-quality environment that would include a variety of architectural styles and open space. Therefore, the Project, in replacing existing uses and structures, and in light of the analysis of changes in visual conditions presented throughout this section, would not substantially degrade the visual quality or character of the HPS Phase II site or its surroundings and the impact would be less than significant. No mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact AE-6 **Implementation of the Project would not substantially degrade the existing visual character or quality of the site or its surroundings. (Less than Significant) *[Criterion E.c]***

As shown by the various photographs and simulations and the accompanying discussions, above, the Project, in replacing existing uses and deteriorating structures, and in light of the analysis of changes in visual conditions presented throughout this section, would not substantially degrade the visual character or quality of the Project site area or its surroundings. In fact, the Project would improve the degraded and deteriorated condition of much of the Project site. The Project would revitalize and redevelop deteriorated, vacant, and underutilized parcels into a vibrant, connected complex of districts that would connect to each other and to existing area neighborhoods. Heights and massing of Project structures that are adjacent to existing neighborhoods would be limited to provide a pleasing visual transition from the existing

neighborhoods through the Project by concentrating taller and more massive structures nearer the interior of the Project site. The project would provide extensive areas of open space integrated with new development and existing open space that would enhance the positive features of Bayview Hunters Point, with its immediate proximity to the shoreline, and would not substantially obstruct views of the Bay, the East Bay hills, and the San Bruno Mountains from adjacent neighborhoods. On the north side, the bridge would cross the extreme eastern edge of the CPSRA area and would cross a small portion of the CPSRA on the south side. The bridge would be designed to integrate with the environment to the maximum extent feasible through openwork, materials, and color, in addition to being designed as a low structure. While the bridge would insert a structure into an improved open space area, it would connect two urbanized areas immediately adjacent. Taking into consideration the context of the entire site, not just the slough, the bridge would not be an element that is substantially out of character or scale with surrounding development. Although the Project would replace the existing conditions with a more dense urban setting, this would not represent an adverse change. The proposed shoreline improvements and new marina would improve the aesthetic quality of the shoreline along the Project frontage, reducing erosion, including marsh plantings where appropriate, and removing debris. These improvements would represent a beneficial impact of the development, improving the overall visual character of the shoreline. The Project would not substantially degrade the visual character or quality of the Project site or its surroundings. The impact would be less than significant. No mitigation is required.

Impact AE-7: Effects of Light and Glare

This analysis assesses spill light and obtrusive light and glare that might be associated with Project lighting for security and parking and from lighting at the 49ers Stadium. As the lighting design has not yet been formulated, it is not possible to calculate the actual output that would be generated by Project lighting. Therefore, this analysis is qualitative, and further lighting analysis may be required when the final design of the Project is completed.

The following terms are used in this discussion:

- *Spill light*—The light emitted from an installation that falls outside the boundaries of the property on which the lighting system is installed
- *Obtrusive light*—Spill light that causes annoyance, discomfort, distraction, or a reduction in the ability to see essential information such as traffic signals
- *Foot-candle*—The recognized international unit for the measure of light (luminance) falling onto a surface

Spill light can be accurately calculated and the effects of spill light can be measured for general understanding and comparison. The effects of obtrusive light are, however, the subject of debate and technical discussion. Attempts have been made to quantify obtrusive light, but this has proven to be difficult, as individuals have a range of reactions to the perceived effects of lighting on the environment. Typical night street lighting requirements are 1 to 3 foot-candles, which is considered to be unobtrusive.

A typical example of glare effects is the car headlight. When viewed directly in front of a vehicle with the headlights on full beam, vision is impaired, resulting in disabling glare. However, when viewed from the side, the same headlights would not impair vision.

The following are examples of light levels, expressed in foot-candles:

- Bright and sunny day: 3,000 foot-candles
- Professional sports field lighting: 300 foot-candles
- Office: 50 to 75 foot-candles
- Residential lighting at night: 7 to 10 foot-candles
- Main road junction street lighting: 2.5 to 3 foot-candles
- Bright moonlight: 0.1 foot-candle

Night illumination of outdoor areas can affect people in several ways. For example, where intense lighting is viewed against a dark background, the contrast attracts the attention of the viewer and could be considered annoying. Under low-light conditions, the human eye adjusts to the brightest light within the field of view. If the range of light intensity to which the eye is exposed is large, the eye will be relatively insensitive to the more dimly lighted areas within the field of view. In addition, increased illumination can affect the suitability of sleeping areas, use of outdoor areas at natural light levels, and privacy. The degree of impacts may be related to the degree of change from the illumination levels to which people have become accustomed.

Impact of Candlestick Point

Impact AE-7a **Implementation of the Project at Candlestick Point would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties. (Less than Significant with Mitigation) *[Criterion E.d]***

The Project would eliminate light associated with night events at the existing Candlestick Park stadium, but would include new sources of light associated with regional retail and arena use during the evening and from residential uses at night. Street lighting and lighting for public areas would increase ambient light, as would security lighting and lighting for parking areas. The new sources of light would be typical of urban development elsewhere in San Francisco and would not generate obtrusive lighting that would adversely affect day or night views or negatively affect other neighborhoods.

There is currently some night lighting on the site from Candlestick Park during night events and from existing uses on the site. Night lighting in the immediate area is produced by street lights and vehicular headlights along US-101, Harney Way, Hawes Street, Innes Avenue, Carroll Avenue, Gilman Avenue, and other local streets, as well as exterior lighting from the residential and commercial/industrial uses on and adjacent to Candlestick Point. In particular, there are existing moderate to high lighting levels from the Alice Griffith Public Housing site. Thus, moderate lighting levels characterize the existing ambient night lighting in the Project area and on Candlestick Point.

Project lighting would be used to highlight architectural elements, landscaping, and building tenant and Project signage. Project signage would be regulated by the Agency through the permit and plan review process and applicable City codes. The types of signs that could contribute to an increase in lighting would generally be restricted to entrance signage and marquee building signs in the commercial areas. In addition, security and safety lighting would be provided, as necessary, in parking areas, service passages, and common areas of the Project utilized by employees and visitors. Further, increased vehicular traffic resulting from the Project could result in more opportunities for vehicular headlights to affect adjacent residences.

Final lighting design has not been completed. As the Project proceeds through the design process, a lighting plan would include the types and locations of all fixtures. The intent of the lighting design would be to provide varied ambiance to the night appearance while providing a general overall level of illumination consistent with customary municipal safety standards. Lighting structures need to be in scale with the surrounding buildings. Also, while on-site lighting needs to be bright enough to promote the general safety of new uses, great care must be taken to prevent "spillage" of lighting and glare into nearby residential neighborhoods. Area lighting sources would be subject to fixture height requirements, oriented toward the ground, or screened to minimize illumination into off-site areas and to prevent glare or interference with vehicular traffic. Very limited and low-level lighting would be provided in open space areas. In these areas, lighting would be limited to decorative lighting along walkways.

Area lighting would illuminate larger areas that are well-traveled so as to promote way-finding and provide for a safe environment. In addition to area lighting, building lighting would be provided. Building lighting would be angled towards building surfaces for aesthetic purposes and/or to illuminate signs. Both types of lighting would be designed to avoid direct visibility of the light source. Because much of Candlestick Point is open space and currently minimally lighted, the transition to a more intense urban environment as a result of the Project would in some areas of the site substantially increase ambient lighting from Project structures and vehicle headlights. However, this increase in ambient light would be consistent with the urban character and associated ambient lighting of the City as a whole. Because the Project site is located immediately adjacent to a developed urban area, existing views of the night sky are diminished as is typical in all urban areas. Nighttime lighting would not affect users of the Yosemite Slough/CPSRA, as the CPSRA is closed after dark. Therefore, the light and glare as a result of the Project would not substantially interfere with these currently limited views.

Long-range views of a partial downtown skyline are available from various vantage points at Candlestick Point and Bayview Hunters Point (refer to Figure III.E-18). At night, some downtown illumination is visible against the dark waters of the Bay. Project development at Candlestick Point could somewhat diminish the visual effect of downtown illumination by providing a new source of lighting in the foreground. However, because only a very small portion of an illuminated downtown skyline is seen at night and because it is already substantially blocked by intervening topography, any reduction in the visibility of the downtown night skyline from south of the Project site would be less than significant.

Views of the Project site are also available from Alameda and Oakland, across the Bay. Night views would change from a relatively unlighted or moderately lighted condition to a high level of illumination. However, because of the intervening distance of at least 5 miles, the increased lighting from the Project would not interfere with any existing views of the night sky from these locations, nor would glare affect those viewers.

The following mitigation measures would be implemented to reduce any potential significant lighting impacts to a less-than-significant level:

MM AE-7a.1 *Lighting Direction/Fixtures and Screening Walls to Minimize Glare and Light Spill. The Applicant shall ensure that all parking lot and other security lighting shall be directed away from surrounding land uses and towards the specific location intended for illumination. State-of-the-art fixtures shall be used, and all lighting shall be shielded to minimize the production of glare and light spill onto surrounding use. All parking structures shall be constructed with screening walls of sufficient height to block spill light from vehicle headlights.*

MM AE-7a.2 *Low-level/Unobtrusive Light Fixtures. The Applicant shall ensure that landscape illumination and exterior sign lighting shall be accomplished with low-level, unobtrusive fixtures.*

- *MM AE-7a.3* *Lighting Plan. The Developer shall prepare a lighting plan for each sub-phase of the Project and submit it approval of a sub-phase. Outdoor lighting shall maintain a minimum required illumination, as determined appropriate by the Agency for all parking and pedestrian areas. In addition, the plan shall include details such as beam spreads and/or photometric calculation, location and type of fixtures, exterior colors, details on foundations, and arrangement of exterior lighting such that it does not create glare, hazardous interference on adjacent streets, or properties or result in spill light that would adversely impact sensitive receptors in the project area.*

Glare is considered the discomfort or impairment of vision experienced when the image is excessively bright in relation to the general surroundings. Implementation of the Project would create new sources of daytime glare if new building surfaces include the use of reflective materials. These new sources of glare could affect sensitive uses in adjacent residential neighborhoods as well as residents of the Project itself.

Numerous sources of daytime glare currently exist in the Project area from building surfaces and windows. Some additional glare could be produced by the increased amount of surface area of the proposed structures, which could reflect or concentrate sunlight and result in a potentially significant impact. Exterior building surfaces and windows can be a source of glare, particularly if highly reflective surfaces are utilized. City Resolution 9212 prohibits the use of highly reflective or mirrored glass in new construction. The Project would use finish materials such as stucco and wood framing. Glass surfaces would not be mirrored, highly reflective, or densely tinted glass, as directed by planning guidelines. In addition, landscaping adjacent to the structures would soften and diffuse glare from the structure surfaces and windows. Use of nonreflective textured surfaces on building exteriors, as well as avoidance of the use of reflective glass, would reduce impacts related to daytime glare to a less-than-significant level.

The following mitigation measure would be implemented to reduce any potential significant glare impacts to a less-than significant-level.

MM AE-7a.4 *Non-reflective Exterior Surfaces to Minimize Glare Impacts. The Applicant shall ensure that design of the proposed structures shall include the use of textured or other nonreflective exterior surfaces and nonreflective glass.*

Implementation of the identified mitigation measures and compliance with Resolution 9212 would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light from Project lighting, screening vehicle headlights to the maximum extent feasible, and eliminating or minimizing increased glare through the use of nonreflective glass and nonreflective textured surfaces in the proposed development.

Impact of Hunters Point Shipyard Phase II

Impact AE-7b **Implementation of the Project at HPS Phase II would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties. (Less than Significant with Mitigation)** ***[Criterion E.d]***

HPS Phase II would include new sources of light associated with neighborhood retail use during the evening and from residential uses at night. Although the new stadium would be included in this area, the light effects from the new stadium would be similar to the existing lighting effects from Candlestick Park stadium. Street lighting and lighting for public areas would increase the ambient light, as would security lighting and lighting for parking areas. The new sources of light would be typical of urban development elsewhere in San Francisco and would not generate obtrusive lighting that would adversely affect day or night views or negatively affect other neighborhoods.

Views of the Project site are also available from Alameda and Oakland, across the Bay. Night views would change from a relatively unlighted or moderately lighted condition to a high level of illumination. However, because of the intervening distance, the increased lighting from the Project would not interfere with any existing views of the night sky from these locations, nor would glare affect those viewers.

Like the current stadium at Candlestick Point, the San Francisco 49ers stadium would be used primarily for professional football games, but could also be used for other events, such as concerts, festivals, international soccer games, or other sporting events. The National Football League schedule includes four preseason games and 16 regular-season games generally beginning in August and running through December. Post-season play occurs in January. In one season, the San Francisco 49ers would play up to three pre-season and eight regular season games at home.[134] The majority of NFL games would occur during the day, beginning at 1:00 P.M., but some night games, typically on Thursday, Sunday, or Monday nights, could occur. Other events could be held during the day or night, but as with football games, day events would be more common. It is estimated that there would up to 20 evening or night events at the stadium.

Lighting for the stadium would be required to be consistent with NFL Sports Lighting Design Criteria. Lighting would consist of event field lighting, exterior stadium lighting (i.e., building perimeter lighting and parking lot lighting), and emergency lighting. The exact type and quantity of light bulbs and fixtures would be determined by the manufacturer's ability to achieve the performance criteria required for players, spectators, and television broadcasts, which would apply to the entire playing field including an additional 15 feet beyond the end zones and sidelines. Lighting levels in the stands would gradually taper off from the maximum light intensity levels on the playing field. Field lighting would only be required for large events during evening hours such as a late afternoon or evening sporting events or a concert. Modern field lights are designed for specific directional light and reduction of spill light. Data have shown that less than three foot-candles can be achieved one block away from the stadium and less than one foot-candle of illumination two blocks away from the stadium.[135] Three and one foot-candles are comparable to normal street lighting in most residential streets. While the overall ambient

[134] Each NFL team typically plays four preseason games. The NFL has a 17-week regular season. Each season, all NFL teams have one bye week where the team does not play. Therefore, each team plays 16 regular season games during the 17-week period.
[135] ME Engineers of Wheatridge, Colorado, December 16, 2004.

light levels on the site would noticeably increase when the field lights are in use, the lighting would not spill over or directly impact residences in the neighborhoods west and northwest of the HPS Phase II site, or the residences within the Project itself. Users of the Yosemite Slough/CPSRA would not be affected by nighttime lighting, as the CPSRA is closed after dark.

The top row of stadium seating would be at an elevation of approximately 156 feet above the playing field; the top of the stadium light towers would be at an approximate elevation of 192 feet. As noted, the lighting system for the stadium has not been designed at this time. The stadium lighting would meet criteria for lighting for players, spectators and television broadcasts, and would likely provide 250 foot-candles to 300 foot-candles at the field level. The 192-foot tall lighting units would allow the light to be angled downward and would use fixtures that focus light on the field and reduce glare. In addition, because the stadium would height would reach 156 feet above the playing field, the illuminated portion of the playing field would not be visible from adjacent areas. Scoreboards and lighted signage would also be a source of night illumination.

Parking area lighting would be closest to the proposed R&D development, which would not be considered sensitive to evening lighting from the parking lots. The nearest residential uses would be in HPS Phase I, approximately 500 feet north of the northernmost parking area. Those residences would be approximately 50 to 200 feet above the grade of the parking facilities for the stadium and, although the lighted parking areas would be visible from HPS Phase I, the residents would not be exposed to direct lighting from the parking areas. This would be a less-than-significant impact.

Information on lighting effects for the San Francisco Giants Ballpark provides a comparison of potential of off-site light effects. The EIR for the San Francisco Giants Ballpark[136] analyzed the effects of stadium lighting on off-site receptors at varying distances from the stadium. For example, computer modeling of light generated by stadium lighting resulted in light levels of 1.0 foot-candle[137] at 300 feet, 0.2 foot-candle at 800 feet, and 0.0 foot-candle at 1,500 feet.[138] As noted above, the nearest residential use to the proposed 49ers Stadium would be HPS Phase I residential uses, approximately 650 feet north of the stadium. Based on the light levels for the Giants Ballpark, light levels at this location would be between 0.2 and 1.0 foot-candle. Such a change in the light level at this location would be less than that associated with typical street lighting, which would not be substantial. Light levels from the stadium at other locations, such as Mariner Village, approximately 1,250 feet away, and the proposed HPS Phase I development along Crisp Road, and residential development within HPS Phase II, each approximately 1,500 feet or more away, also would not be substantial. As noted, users of the Yosemite Slough/CPSRA would not be affected by stadium lighting, as the CPSRA is closed after dark. Nonetheless, the light fixtures themselves would be directly visible from some locations, and could diminish night views from these areas, which some residents could find obtrusive. However, night events would occur up to about 20-25 days per year (including night football games and other events that might be held at the stadium), and the impact, if any, would be intermittent and infrequent.

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136 *San Francisco Giants Ballpark at China Basin Final Environmental Impact Report*, 96.176E, certified June 26, 1997.

137 A foot-candle is a unit of light intensity that represents the illumination given off by a single candle at a distance of one foot. For comparison, the light level of a bright sunny day would be approximately 3,000 foot-candles, lighting at a professional stadium would be 300 foot-candles, street lighting on a main road junction would be 2.5 to 3.0 foot-candles, and bright moonlight would be 0.1 foot-candle.

138 *San Francisco Giants Ballpark at China Basin Final Environmental Impact Report*, 96.176E, certified June 26, 1997, pp. IV.36 to IV.41.

To reduce impacts from light and glare from the San Francisco 49ers stadium, the following mitigation measures would be implemented:

MM AE-7b.1 *Testing of the Field-Lighting System. Prior to opening the stadium, the Stadium Operator shall test the installed field-lighting system to ensure that lighting meets operating requirements in the stadium and minimizes obtrusive spill lighting in the ballpark facility. Testing shall include light-meter measurements at selected locations in the vicinity to measure spill lighting from stadium field-lighting fixtures, permit adjustment of lighting fixtures, and confirm that spill-lighting effects shall be within an acceptable range and compatible with typical street lighting fixtures.*

MM AE-7b.2 *Stadium Lighting Orientation and Cut-Off Shields. Prior to opening the stadium, the Stadium Operator shall ensure that stadium lighting is oriented in such a manner to reduce the amount of light shed onto sensitive receptors and incorporate "cut-off" shields as appropriate to minimize any increase in lighting at adjacent properties, providing that it still meets the standard of lighting for football operations.*

Implementation of the identified mitigation measures would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light from Project lighting, screening vehicle headlights to the maximum extent feasible, and eliminating or minimizing increased glare by the use of nonreflective glass and nonreflective textured surfaces in the proposed development. Mitigation measures MM AE-7b.1 and MM AE-7b.2 would ensure that the impact of stadium lighting would be less than significant by requiring that the stadium operator test the installed field-lighting system to ensure that lighting meets the operating requirements in the stadium and minimizes obtrusive spill lighting from the facility.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact AE-7 **Implementation of the Project would not create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties. (Less than Significant with Mitigation) *[Criterion E.d]***

The Project would include new sources of light associated with neighborhood retail use during the evening and from residential uses at night and would change an area of low- to moderate-level illumination to an area of moderate to high illumination. Project lighting would be used to highlight architectural elements, landscaping, and building tenant and project signage. In addition, the new San Francisco 49ers stadium on HPS Phase II would provide a source of illumination in a different location from the existing Candlestick Park stadium.

Area lighting would illuminate larger areas that are well traveled so as to promote way finding and provide for a safe environment. In addition to area lighting, building lighting would be provided. Building lighting would be angled towards building surfaces for aesthetic purposes and/or to illuminate signs. Both types of lighting would be designed to avoid direct visibility of the light source. Because a large portion of the Project site is open space or vacant parcels and currently minimally lighted, the transition to a more intense urban environment as a result of the Project would in some areas of the site substantially increase ambient lighting from Project structures and vehicle headlights. However, this increase in ambient light would be consistent with the urban character and associated ambient lighting of the City as a whole. Because the Project site is located immediately adjacent to an intensively developed urban area, views of the night sky are diminished as they are in all urban areas, and the light and glare as a result of the Project would not substantially interfere with these currently limited views.

Long-range views of a partial downtown skyline are held from various vantage points at Candlestick Point and Bayview Hunters Point (refer to Figure III.E-18). At night, downtown illumination is visible against the dark waters of the Bay. Project development would somewhat diminish the visual effect of the downtown illumination by providing a new source of lighting in the foreground. However, because only a small portion of an illuminated downtown skyline is seen at night, and because it is already blocked by intervening topography, any reduction in the view of downtown illumination would be less than significant.

Views of the Project site are also held from Alameda and Oakland, across the Bay. Night views would change from a relatively unlighted or moderately lighted condition to a high level of illumination. However, because of the intervening distance, the increased lighting from the Project would not interfere with any existing views of the night sky from these locations, nor would glare affect those viewers.

Increased lighting on the site relative to existing outdoor lighting and new building surfaces would increase the level of illumination in the area. Implementation of mitigation measures MM AE-7a.1 through MM AE-7a.4 would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light from Project lighting, screening vehicle headlights to the maximum extent feasible, and eliminating or minimizing increased glare by the use of nonreflective glass and nonreflective textured surfaces in the proposed development. Mitigation measures MM AE-7b.1 and MM AE-7b.2 would ensure that the impact of stadium lighting would be less than significant by requiring that the stadium developer test the installed field-lighting system to ensure that lighting meets the operating requirements in the stadium and minimizes obtrusive spill lighting from the facility.

Cumulative Impacts

The geographic context for the analysis of visual impacts varies depending on the threshold analyzed. For example, the context for an analysis of scenic vistas would necessarily encompass a broader geographic area than an analysis of visual character or light and glare. For each threshold analyzed, below, the applicable geographic context is described.

Construction Impacts

The geographic context for an analysis of construction impacts is the same limited geographic area as the Project, as visual construction impacts are generally site-specific. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development includes existing development at Candlestick Point and Hunters Point, extending generally to the east of US-101 between Candlestick Cove and India Basin, which includes Executive Park, as well as the Yosemite Slough Restoration Project, which has been approved and will restore tidal wetlands in a 34-acre parcel of the CPSRA.

Construction impacts on aesthetics are site-specific, as construction activities are temporary. Therefore, the geographic context for an analysis of cumulative construction impacts to aesthetics would be limited to projects in the immediate vicinity of the Project that could be seen together with the Project, assuming that construction activities were to be concurrent. These projects would include the Yosemite Slough Restoration Project, Executive Park, and HPS Phase I, which have been approved and/or are under construction.

Construction activities associated with development of cumulative projects in the defined area would not obstruct any scenic vistas, such as views of the Bay or the San Bruno Mountains, as most construction equipment is not tall or wide enough to physically interfere with views. Other visual impacts associated with construction of related projects, such as exposed pads and staging areas for grading, excavation, and construction equipment, would occur. In addition, temporary structures could be located on the construction sites during various stages of construction, within materials storage areas, or associated with construction debris piles on site. Exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible during construction of utility infrastructure improvements. As part of the environmental review process, most or all of the cumulative projects would be required to temporarily screen, to the maximum extent feasible, any unsightly views during construction to minimize the impact on scenic vistas and on visual character. Because these visual intrusions are temporary, they would not be considered significant.

Construction would occur during daylight hours, generally between 7:00 A.M. and 8:00 P.M. or as otherwise allowed by the City. A minimal amount of glare could result from reflection of sunlight off windows of trucks, but this would be negligible and would not affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the Project site, and would not exceed the level of existing night lighting levels in urban areas. Therefore, the Project's construction activities would have less-than-significant light and glare impacts

The Project would result in less-than-significant construction-related impacts to visual character and light and glare, and would not have any construction-related impacts on scenic vistas. Therefore, the Project would not contribute to any potentially significant impact on visual resources that could result from development of the cumulative projects, and the Project's construction-related cumulative impact on visual resources would be less than significant.

Operational Impacts

Effects on Scenic Vistas

The geographic context for an analysis of cumulative impacts on scenic vistas is the area covered by the BVHP Redevelopment Plan, the HPS Redevelopment Plan, and the BVHP Area Plan (of the City's General Plan), as development in these Plan areas could affect the same scenic vistas analyzed for the Project as identified in Figure III.E-11 through Figure III.E-18. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation

- of cumulative impacts. Reasonably foreseeable future development includes development at Candlestick Point and Hunters Point, extending generally to the east of US-101 between Candlestick Cove and India Basin, which includes the Yosemite Slough Restoration Project, Executive Park, Jamestown, Hunters Point Shipyard Phase I, Hunters View, and India Basin Shoreline Area C.

- The areas described by these plans contain a mixture of land uses, including open space, residential, commercial, and industrial. The past and present development in these areas is described in Section III.E.2 (Setting) of this section, representing the baseline conditions for evaluation of cumulative impacts to scenic vistas. Scenic vistas may be generally described as panoramic views of a large geographic area, for which the field of view can be wide, extend into the distance, and associated with vantage points that provide an orientation not commonly available. Examples of scenic vistas include urban skylines, valleys, mountain

ranges, or large bodies of water. For the Project, the scenic vistas that could be affected are of the downtown skyline, the San Francisco Bay, the East Bay hills, and San Bruno Mountains. Significant impacts on a scenic vista would occur if a project would substantially degrade or obstruct important scenic views from public areas.

Policy 1.1 in the Urban Design Element of the San Francisco General Plan emphasizes the City's desire to recognize and protect major views in the City, with particular attention to those of open space and water. While each cumulative project would be required to comply with design review requirements, development of one or more cumulative projects could result in obstruction of scenic vistas held from various vantage points in the City toward the Bay, the East Bay hills, and San Bruno Mountains, depending on the height, massing, and density of future development in the Plan areas. This is a potentially significant impact.

- Overall, development of the Project would not substantially block publicly accessible views of the Bay or other scenic areas. The Project would provide a continuation of the existing street grid, thereby maintaining existing view corridors to the Bay and East Bay hills. The Project would also provide new parks and open space facilities. Public access areas (City and State parks) would provide views from the Project site toward the East Bay and the Bay. The Yosemite Slough Restoration Project would restore tidal wetlands in a 34-acre parcel of the CPSRA immediately adjacent to the Project site and would include continuation of the Bay Trail and viewpoints/interpretative signage. The bridge component of the Project would place a low bridge structure across the neck of the slough that would partially obstruct a scenic view from the slough toward the Bay from some vantage points. Views of the Bay and the remainder of the slough would be retained from numerous other vantage points, including along the shoreline, from the view corridors within the Project site, the CPSRA, and the proposed bridge itself. The Project would improve access to the entire area, allowing a greater number of people to take advantage of the scenic resources at CPSRA and the slough. The General Plan Urban Design Element contains policies that guide development in order to protect scenic views and promote visual harmony. The cumulative projects would conform to these guiding principles, the same as the Project, and all projects are subject to design review by the Planning Department to ensure consistency with the General Plan. Since development of cumulative projects within the defined geographic context would not likely result in an adverse impact on scenic vistas, there would be no cumulative impact to which the Project could contribute. Even if there were an adverse impact on scenic vistas due to the cumulative development, however, the Project's incremental contribution would not be cumulatively considerable, as the Project would not result in a substantial adverse impact on any scenic vista. Therefore, the Project's cumulative impact would be less than significant.

Effects on Scenic Resources

The geographic context for an analysis of cumulative impacts on scenic resources is the area covered by the BVHP Redevelopment Plan, the HPS Redevelopment Plan, and the BVHP Area Plan (of the City's General Plan), as development in these Plan areas could affect the same scenic vistas analyzed for the Project as identified in Figure III.E-11 through Figure III.E-18. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation

- of cumulative impacts. Reasonably foreseeable future development includes the Yosemite Slough Restoration Project and development at Candlestick Point and Hunters Point, extending generally to the east of US-101 between Candlestick Cove and India Basin, which includes Executive Park, Jamestown, Hunters Point Shipyard Phase I, Hunters View, and India Basin Shoreline Area C.

- Damage to scenic resources would occur if a project would directly affect environmental features, such as topographic features, landscaping, or a built landmark, that contribute to a scenic public setting. There are no identified built landmarks topographic features, or landscaping that contributes to a scenic public setting in the Plan area except for Double Rock, Bayview Hill, Hunters Point Hill, the Re-gunning crane, CPSRA, and the Yosemite Slough. The General Plan Urban Design Element contains policies that guide development near major topographic features such as substantial hills to prevent development from overwhelming the land form and adversely affecting these features. The cumulative projects would conform to these guiding principles, the same as the Project. The Project would include redevelopment of Candlestick Park stadium and associated paved and unpaved parking lots; the Project would also include new housing and replacement of existing housing on undeveloped parcels on the Alice Griffith Public Housing site, and remove other existing uses, such as the Candlestick RV Park. The majority of these sites include limited landscaping. Those areas of Candlestick Point do not contain natural or built features that would be considered scenic resources or other features that contribute to the scenic public setting. The Yosemite Slough bridge would change the setting of the Slough, with the bridge structure and roadway approaches, and the bridge would replace some views of open water as seen from nearby locations. Yosemite Slough would continue to be a scenic resource as a waterway bordered by open space opening from a narrow channel to the west to the wider South Basin to the east. Overall, the bridge would not substantially damage a resource that contributes to a scenic public setting. On completion of the Yosemite Slough Restoration Project, publicly held views from the proposed bridge would include the improved slough area, as well as the Bay, and provide additional viewing opportunities that would not exist without the Project. The Project would retain structures at the identified Drydock Historic District and the Re-gunning crane, a landmark visible from short and long-range views. The HPS Phase II site does not contain other features that would be considered scenic resources that contribute to the scenic public setting. The proposed shoreline improvements would improve the aesthetic quality of the shoreline along the Project frontage, reducing erosion, including marsh plantings where appropriate, and removing debris. These improvements would represent a beneficial impact of the development, improving the overall visual character of the shoreline.

  Since development of cumulative projects within the defined geographic context would not likely result in an adverse impact on scenic resources, there would be no cumulative impact to which the Project could contribute. Even if there were an adverse impact on scenic resources due to the cumulative development, however, the Project's incremental contribution would not be cumulatively considerable, as the Project would not result in an adverse impact on any scenic resource. Therefore, the Project's cumulative impact would be less than significant.

Effects on Visual Character

The geographic context for an analysis of cumulative impacts on visual character is the area covered by the BVHP Redevelopment Plan, the HPS Redevelopment Plan, and the BVHP Area Plan (of the City's General Plan), as development in these Plan areas could affect the same scenic vistas analyzed for the Project as identified in Figure III.E-11 through Figure III.E-18. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation

- of cumulative impacts. Reasonably foreseeable future development includes development under the Yosemite Slough Restoration Project and at Candlestick Point and Hunters Point, extending generally to the east of US-101 between Candlestick Cove and India Basin, which includes Executive Park, Jamestown, Hunters Point Shipyard Phase I, Hunters View, and India Basin Shoreline Area C.

Visual character refers to the aesthetic character or quality of a streetscape, building, group of buildings, or other manmade or natural feature that creates an overall impression of an area. A project would be considered to degrade the existing visual character if it would result in substantial, demonstrable, negative aesthetic effects on a site or its surroundings.

It is anticipated that future development within the defined geographic area would result in changes to the existing land use environment through conversion of vacant land to developed uses or through conversions of existing land uses (e.g., from residential to commercial or industrial to residential) that could result in a change in visual character.

The goals and objectives of the BVHP Redevelopment Plan are to improve land use conditions. The HPS Redevelopment Plan contemplates development of a range of uses under the broad categories of industrial, research and development, mixed use, cultural and educational, residential, and open space. The BVHP Area Plan is an adopted component of the San Francisco General Plan that serves as a guide the future development of the BVHP community.

Each of these plans contains guidelines for urban design that would ensure compatibility with adjacent land uses and a pleasing visual character. While development in these geographic areas would likely change the existing land use character, the existing condition in many parts of these Plan areas is deteriorated. Change in visual character in and of itself is not adverse and can, in fact, be beneficial. A change from a blighted industrial development to mixed uses, with new housing and commercial areas, would likely be perceived as a positive change in the visual character of the area, as these uses would help implement the objectives of the applicable land use plans and offer increased landscaping, visual integration of structures, and coordinated design schemes. It is anticipated that all future projects proposed in these areas would be consistent with the adopted goals, policies, and objectives of the area Plans and would improve rather than degrade the existing visual character of the land uses.

The Project would result in a substantially different built environment compared to the existing character of the site and vicinity, but would develop new uses that would be well designed and consistent with other development occurring in the Project vicinity. Development patterns would include transitions from low-density residential uses to higher density residential and commercial uses. As noted, above, the Project would increase residential and non-residential densities at the Project site, which would be compatible with existing land uses, in that the Project would eliminate less compatible uses such as industrial and replace them with mixed uses, including residential. The Project would provide connectivity between the existing neighborhoods and the shoreline. Project edges would be designed with lower building heights adjacent to existing neighborhoods and open spaces, stepping up toward the middle of the development. Consistent with the objectives and policies for major new development, the Project would relate new buildings to existing and new open space. The height and bulk of new buildings would range in scale to relate to existing nearby development. The Project would develop a large property intended to be carefully designed with respect to impacts on surrounding areas.

The proposed shoreline improvements would improve the aesthetic quality of the shoreline along the Project frontage, reducing erosion, including marsh plantings where appropriate, and removing debris. These improvements would complement the improvements to the tidal wetlands planned under the Yosemite Slough Restoration Project to provide expanded open space opportunities, including recreational

trails linked to other regional trails and wildlife viewing. These improvements would represent a beneficial impact of the development, improving the overall visual character of the shoreline.

The transition in scale between adjacent neighborhoods and the Project and the varied range of proposed uses would not result in a substantial adverse change in the existing land use character. Since development of cumulative projects within the defined geographic context would not likely result in an adverse impact on existing visual character, there would be no cumulative impact to which the Project could contribute. Even if there were an adverse change in existing visual character due to the cumulative development, however, the Project's incremental contribution would not be cumulatively considerable, as the Project would not result in an adverse change in visual character. Therefore, the cumulative impact would be less than significant.

Effects of Light and Glare

The geographic context for an analysis of cumulative impacts on light and glare is the area covered by the BVHP Redevelopment Plan, the HPS Redevelopment Plan, and the BVHP Area Plan (of the City's General Plan), as development in these Plan areas could affect the same scenic vistas analyzed for the Project as identified in Figure III.E-11 through Figure III.E-18. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development includes development under the Yosemite Slough Restoration Project and at Candlestick Point and Hunters Point, extending generally to the east of US-101 between Candlestick Cove and India Basin, which includes Executive Park, Jamestown, Hunters Point Shipyard Phase I, Hunters View, and India Basin Shoreline Area C.

Development of cumulative projects in the identified Plan areas would result in increased sources of light and glare from building and street lighting, parking lot lighting, vehicle headlights, and increased building surfaces. The new sources of light would be typical of urban development elsewhere in San Francisco, but could generate obtrusive lighting that could adversely affect day or night views or negatively affect other neighborhoods, depending on location and project design. For example, if project driveways were oriented such that vehicle lights would shine on adjacent sensitive receptors, this could be considered an adverse effect. The addition of more numerous sources of illumination would also change the night views onto the Project site from various vantage points, including Oakland and Alameda across the Bay. However, as noted in the Project-level analysis, the intervening distance would mean that this increased illumination would not result in adverse effects on sensitive receptors or interfere with views of the night sky.

Moreover, like the Project, all new development would conform to the guidelines and policies contained in the *Planning Code*, the applicable land use plans and the applicable Redevelopment Plans, which would result in implementation of lighting design and use of non-reflective building surfaces to the maximum extent feasible so as to avoid any adverse light and glare impacts on sensitive receptors. Therefore, as the geographic area is located within an urban context, and projects would conform to the design guidelines contained in the applicable planning documents, there would not be a significant adverse cumulative effect with regard to light and glare from development of cumulative projects. Even if the cumulative projects would result in an adverse light and glare impact, however, the Project's incremental effect would not be cumulatively considerable, as mitigation measures have been included in the Project to avoid spillover light and reduce impacts on sensitive receptors to a less-than-significant level. The Project's cumulative impact with regard to light and glare would be less than significant.

SECTION III.F SHADOWS

III.F.1 Introduction

This section of the EIR examines the potential impacts of shadows cast by buildings that would be developed with the Project. New shading could occur on existing and proposed open space, parks, and recreation areas. The section describes the extent of potential new shading on existing open space owned by or under the jurisdiction of the San Francisco Recreation and Park Department (SFRPD), consistent with *Planning Code* Section 295, The *Planning Code* prohibits the issuance of building permits for structures over 40 feet in height that would cast shade on SFRPD park land that would have a significant effect on the use of the property. Section 295 is further discussed in Regulatory Framework, below. In addition, this section describes the extent of potential new shading on the Candlestick Point State Recreation Area (CPSRA) and on open space proposed as part of the Project at Candlestick Point and at Hunters Point Shipyard Phase II (HPS Phase II). The section evaluates the effects of new shading on the basis of changes in shadow patterns on open space and on the current and expected uses of the existing and proposed open space. The analysis in this section concludes that no potentially significant or significant environmental impacts would result from the Project; therefore, no mitigation measures are included.

The analysis in this section is based on a shadow modeling study completed by CADP, LLC, to evaluate the Project's potential effects on the Project site and in the Project vicinity.[139] The section also uses information on existing conditions and uses in the potentially affected public open space.

III.F.2 Setting

Figure III.F-1 (Existing and Proposed Parks and Open Space) illustrates existing public parks and open space on the Project site and in the Project vicinity.[140] Parks and open space owned by or under the jurisdiction of the Recreation and Park Department include:

- **Candlestick Park**, bounded by Jamestown, Ignacio, and Gilman Avenues on the southwest, northwest, and northeast, respectively; Giants Drive on the northwest; and Hunters Point Expressway to the east. The 83-acre Candlestick Park is the site of Candlestick Park stadium, which is owned by the SFRPD and leased by the San Francisco 49ers National Football League team. The existing stadium, built in 1960, occupies 14.5 acres, seats 70,000, and is used for football games and other non-football entertainment events. The rest of the site is devoted to ancillary uses such as parking, driveways, and service areas.
- **Gilman Park** is a 4.6-acre playground owned by SFRPD immediately northwest of Candlestick Park. It includes plastic and metal play equipment with restrooms, picnic tables, a dog area, and a baseball diamond.

[139] The CADP analysis prepared the graphic shadow output presented in DEIR Figure III.F2 thru Figure III.F27 herein.
[140] The Project vicinity is defined by the Bay and US-101 and includes the nearby surrounding areas of the Bayview Hunters Point neighborhood, CPSRA, Candlestick Point, Hunters Point, and India Basin.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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EXISTING AND PROPOSED PARKS AND OPEN SPACE

FIGURE III.F-1

- **Bayview Park** is a 44-acre park off Third Street and Key Avenue immediately west of the Project site. It is primarily open space on Bayview Hill, rising to about 420 feet. It includes picnic areas, natural habitat areas, and recreational trails. There are no active or developed uses such as playgrounds or recreation facilities.
- **India Basin Shoreline Park**, which is 11.8 acres, is on the India Basin Shoreline north of HPS Phase II and Innes Avenue and includes two children's playgrounds, picnic areas, shoreline access to the Bay for water-dependent recreation, and recreational trails.
- **India Basin Open Space** (about 4.5 acres) is unimproved SFRPD property located along the shoreline of the India Basin Flats, northwest of the Project site, off of Innes Avenue.

Other SFRPD open space within a quarter-mile of the Project site includes:

- **Le Conte Avenue Mini Park** (0.5 acre) is adjacent to Bayview Park.
- **Little Hollywood Park** (0.3 acre) is west of the Project site across US-101.
- **Bayview Playground** is a children's playground on Third Street between Armstrong and Carroll Streets.
- **Milton Myer Recreation Center** at Kiska Road is a multipurpose facility with meeting spaces, an indoor gymnasium, outdoor game courts, and a children's playground.
- The **Bayview Hunters Point Multipurpose Senior Center**, at Yosemite Avenue and Third Street, offers a range of services and activities for seniors.

Heron's Head Park (24 acres), formerly known as Pier 98, is a restored wetland owned by the Port of San Francisco and used for research, education, after school activities, and natural habitat.

CPSRA, totaling 154 acres, is generally bounded by the southeastern extent of the San Francisco shoreline, Harney Way, Jamestown Avenue, Hunters Point Expressway, Donahue Street, Egbert Avenue, and Arelious Walker Drive. Approximately 120.2 acres of the CPSRA is located within the Project site, and an additional approximately 34 acres are located off site, adjacent to the Yosemite Slough. CPSRA is a former landfill on the shoreline of Candlestick Point that was purchased by the State in 1977 for development as a state recreation area. CPSRA includes picnic areas, a fitness course for seniors, a bike path, shoreline access to the Bay for water-dependent recreation, and recreational trails, but much of the land within the CPSRA is not improved enough to support intensive recreational use. For example, land to the north and east of the Candlestick Park stadium is currently used for stadium parking. Other portions of the CPSRA site contain construction rubble and debris, such as the Last Rubble disposal site. Until recently, the Last Rubble area was characterized by large piles of debris, remnants of the site's previous use as a dumping ground. The Integrated Waste Management Board completed a rubble and debris removal project in April 2009. As a result of this, the majority of the rubble and debris was either removed or crushed on site.

III.F.3 Regulatory Framework

Federal

There are no applicable federal regulations relating to solar access or shading effects.

State

There are no applicable state regulations relating to solar access or shading effects.

Local

San Francisco General Plan

The Recreation and Open Space Element of the *City of San Francisco General Plan* (1996) includes the following policy applicable to potential solar access or shading impacts of the Project:

Policy 2.3 Solar access to public open space should be protected.

The policy promotes solar access and avoiding shade to maintain the usability of public open space, and states that the requirements of *Planning Code* Section 295 apply to the review of projects that could shade SFRPD property. (*Planning Code* Section 295 is discussed further below). Policy 2.3 further states that:

> A number of other open spaces designated in this Element or elsewhere in the General Plan are under the jurisdiction of other public agencies, or are privately owned and therefore not protected by the Planning Code amendments. These spaces should be given other forms of protection to assure they are not shaded during the hours of their most intensive use. Any new shading should be remedied to the extent feasible by expanding opportunities for public assembly and recreation in indoor and outdoor settings.

San Francisco Planning Code

Planning Code Section 295, adopted in 1984 pursuant to voter approval of Proposition K, "The Sunlight Ordinance," prohibits the issuance of building permits for structures over 40 feet in height that would cast shade or shadow on property under the jurisdiction of, or designated to be acquired by, the Recreation and Park Commission between one hour after sunrise to one hour before sunset at any time of year, unless the Planning Commission determines that the shade or shadow would have an insignificant adverse impact on the use of such property. *Planning Code* Section 295 provides that:

> The City Planning Commission shall conduct a hearing and shall disapprove the issuance of any building permit governed by the provisions of this Section if it finds that the proposed project will have any adverse impact on the use of the property under the jurisdiction of, or designated for acquisition by, the Recreation and Park Commission because of the shading or shadowing that it will cause, unless it is determined that the impact would be insignificant. The City Planning Commission shall not make the determination required by the provisions of this Subsection until the general manager of the Recreation and Park Department in consultation with the Recreation and Park Commission has had an opportunity to review and comment to the City Planning Commission upon the proposed project.

As required by *Planning Code* Section 295, the Recreation and Park Commission and the Planning Commission adopted criteria in 1987 and 1989 for the review of shade, solar access, and shadow effects.[141] According those adopted criteria, shadow is measured by multiplying the area of the shadow by the amount of time the shadow is present on the park, in units called "square foot-hours." Determining the shadow impact caused by a project begins with a calculation of the number of square foot-hours the project casts on a protected property over the course of a year during the each day an hour after sunrise to an hour

[141] San Francisco Planning Department. *Planning Code Section 295, Presentation for Planning Commission Hearing on October 23, 2003*. This report is an overview of current procedures for Planning Department review of applications that are subject to Section 295, and includes a review of the *Planning Code* requirements and of the implementation document adopted jointly by the Recreation and Park and the Planning Commissions, and a description of the technical methodology for analysis of shadow impacts on protected properties.

before sunset summed over the course of a year, ignoring shadow from any surrounding structures, and from clouds, fog, and solar eclipses. This is called the "Annual Available Sunlight" (AAS) for that park. The shadow impact of the project is defined as the shadow in square foot-hours cast by the project divided by the AAS, expressed as a percentage. Further, in addition to quantitative criteria, the adopted criteria set forth qualitative criteria for evaluation of shadow. Those criteria for assessing new shadow would be based on existing shadow profiles, important times of day, important seasons in the year, location of the new shadow, size, and duration of new shadows and the public good served by buildings casting new shadow.

Also, the adopted criteria state that small parks, less than two acres in area, with existing shadow loads of 20 percent or larger should not be subjected to additional shadow by new development. Larger parks (two acres or more), with shadow loads between 20 percent and 40 percent would have an additional new shadow budget of 0.1 percent. Larger parks with existing shadow loads of less than 20 percent would have an additional new shadow budget of 1.0 percent. (The adopted criteria also include absolute cumulative limits for increase in percent shading for 14 parks in the downtown. However, none of those parks are in the Project vicinity; therefore, the limits for smaller and larger parks noted above would apply to SFRPD property.)

As noted above, parks and open space within the Project site or in the Project vicinity that are under the jurisdiction of the SFRPD include Candlestick Park, Bayview Park, Gilman Park, India Basin Shoreline Park, and India Basin Open Space. Development near these parks is subject to shadow review under *Planning Code* Section 295, except for Candlestick Park, which would be removed from the jurisdiction of the Recreation and Park Department as a result of the Project.

III.F.4 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts related to shadows, but generally consider that implementation of the Project would have significant impacts if it were to:

F.a Create new shadow in a manner that substantially affects outdoor recreation facilities or other public areas

In addition, shadow effects would be significant if they would affect, in an adverse manner, the use of any park or open space under the jurisdiction of the SFRPD, or significantly detract from the usability of other existing publicly accessible open space.

Analytic Method

For purposes of this analysis, "outdoor recreation areas or other public areas," as described in the above significance criteria, refers to parks, outdoor recreational facilities (i.e., sports fields), or other public open space. The term "open space" is used herein generally to refer to such public areas that may be affected by shadows. The analysis considers the Project's potential effects on SFRPD property subject to *Planning Code* Section 295, including Bayview Park, Gilman Park, India Basin Shoreline Park, and India Basin Open Space. In addition, the analysis considers the Project's potential effects on other existing publicly accessible open space (CSPRA) and the new parks and open space that would be provided by the Project.

As noted above, a shadow modeling study was completed by CADP, which depicts the shadows that would be cast by buildings that would result from the Project. This analysis accounts the effects of existing topography, but does not include shadows caused by existing buildings on the site, as they would either be demolished (e.g., Candlestick Park stadium and Alice Griffith Housing) or if retained (e.g., Building 101 and certain historic buildings as described in Section III.J, Cultural and Paleontological Resources) are generally all less than 40 feet and would only cast limited shadows. In addition, in order to identify Project impacts, the analysis does not include shadows cast by any existing or proposed development in the project vicinity.

The results of the shadow modeling analysis are depicted in two types of illustrations: (1) "shadow fans" or "shadow traces" that identify the maximum extent of all project-related shadows from one hour after sunrise to one hour before sunset over an entire year (per the review requirements of *Planning Code* Section 295); and (2) time-specific shadow patterns for 10:00 A.M., noon, and 3:00 P.M. Pacific Standard Time (PST) in December (the winter solstice) and March (the vernal equinox), and at 10:00 A.M., noon, and 3:00 P.M. Pacific Daylight Time (PDT) in June (the summer solstice) and September (the autumnal equinox), which depict shadow impacts at specific times of the day for the minimum, midpoint, and maximum elevations of the sun.

Figure III.F-2 (Candlestick Point Proposed Project Year-Round Shadow Trace) and Figure III.F-15 (Hunters Point Shipyard Phase II Proposed Project Year-Round Shadow Trace) identify the maximum extent of all Project-generated shadows from one hour after sunrise to one hour before sunset over an entire year. The year-round shadow trace provides a conservative assessment in that it includes shadow from all buildings within the Project site, including buildings that would not exceed 40 feet in height and therefore would not require review under the requirements of Section 295. While the shadow trace provides information on parks and open space that could be affected by new shading from Project structures over an entire year, it does not provide information on the specific shadow effects experienced by a park or open space at any particular time of the day or year.

Figure III.F-3 through Figure III.F-14 (Candlestick Point Shadow Patterns) and Figure III.F-16 through Figure III.F-27 (Hunters Point Shipyard Phase II Shadow Patterns) depict Project-generated shadow patterns for particular times of the day during the four seasons: at the winter and summer solstices, when the elevation of sun is at its lowest and highest point, and at the spring and fall equinoxes, when the elevation of the sun is at its midpoint.

Planning Code Section 295 identifies both a quantitative methodology for assessment of shadow impacts (for land under the jurisdiction of the SFRPD, as discussed above in Regulatory Framework) and provides qualitative criteria for determining whether impacts would be adverse. If the quantitative assessment determines that the standards established in *Planning Code* Section 295 would be exceeded, this EIR provides additional analysis of the shadow effects for a variety of qualitative factors, which may include: open space usage; time of day and/or time of year during which the shadow occurs; physical layout and facilities affected by the shadow; intensity, size, shape, and location of shadow; and proportion of open space affected by shadow. If, upon balancing the above factors, the qualitative analysis determines that the enjoyment of the park or public space by users would be substantially and adversely affected, then the Project would be determined to have a significant shadow impact under CEQA.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: PROPOSED PROJECT YEAR-ROUND SHADOW TRACE

FIGURE III.F-2

- For parks and open space that are not subject to the review requirements of *Planning Code* Section 295, only a qualitative assessment of shadow effects is provided, to determine whether enjoyment of the park or public space by users would be substantially and adversely affected by shadow effects. The specific times selected for analysis and depiction on the shadow pattern figures (10:00 A.M., noon, and 3:00 P.M.) are customarily evaluated to identify effects on use of open space as they represent the midday periods of the most intensive use of parks and open space areas. It is acknowledged that park users could be present before 10:00 A.M. or after 3:00 P.M. when additional Project shadows may occur, but levels of use at those times would be lower than the midday periods. Therefore, shadow effects before 10:00 A.M. or after 3:00 P.M. would affect fewer uses and open space and would not be considered to be significant adverse impacts for this analysis.

Figure III.F-2 indicates that the Project would add shade to two SFRPD parks, Gilman Park and Bayview Park. However, as discussed herein, the effects on Gilman Park would result from Project buildings up to 40 feet in height. Those effects would not be subject to review under Section 295. The Project would not include other structures over 40 feet in height close enough to Gilman Park to cause such effects. As noted above, Bayview Park consists of open space, including steep topography and informal trails. There are no active uses (such as playgrounds and recreational fields) and access is only provided via a gated road off of Key Avenue, north of Bayview Hill. The Project would shade an area of Bayview Park that does not provide any active uses, and is relatively steep. Based on the shadow trace, the Project would only shade Bayview Park during the first hour after sunrise in spring, summer, and fall months, and would not create any new shadow by 10:00 A.M. at any time of year.

The analysis of Project effects presented below discusses shadow effects on Gilman Park and Bayview Park, when they would occur, and whether those effects would be adverse impacts on the open space.

The other public parks and open space in the Project vicinity that would continue to be subject to *Planning Code* Section 295 include India Basin Shoreline Park and India Basin Flats; however, no Project structures in excess of 40 feet in height are planned sufficiently close to these parks to create shadow effects. Refer to Figure III.F-1.

Parks and Open Space not Subject to Section 295 of the Planning Code

The CPSRA is not owned by or under the jurisdiction of SFRPD and is, therefore, not subject to *Planning Code* Section 295. The other public parks and open space included as part of the Project would not be owned by or under the jurisdiction of the SFRPD and, therefore, would also not be subject to *Planning Code* Section 295.

The ownership of the existing Candlestick Park would be transferred as part of the Project and the existing stadium, ancillary structures, and parking areas would be removed. As such, the area of the former stadium and associated parking lots, which are not typical parks or open space, would no longer be under the jurisdiction of SFRPD and would not be subject to *Planning Code* Section 295.

As shown in Figure III.F-1, the Project would develop new parks and open space, including neighborhood parks, destination parks, boulevard barks, and waterfront trails. The parks would include a range of passive and active recreation facilities, playgrounds, walks, and other features. While new Project buildings would add shade new Project open space, the Project would increase public open space that would serve Project residents visitors, and employees, compared to existing conditions. Therefore, the impact analysis herein discusses those shadow effects, but does not consider those to be adverse impacts.

Construction Impacts

Construction of the Project features would not create adverse shadow effects on open space, because construction activities and equipment, would not cast substantive shadows on existing open spaces such as the CPSRA. Although some construction equipment, such as cranes, would exceed 40 feet in height, the shadows cast by this equipment would not be substantial in size (due to the crane's lack of bulk) and would be temporary and limited to the period of construction.

Operational Impacts

Impact SH-1: Shadow Effects on Public Open Space

Impact of Candlestick Point

Impact SH-1a **Implementation of the Project at Candlestick Point would not result in new structures with the potential to cast shadows on existing or proposed parks and open space in a manner that would have an adverse effect on the use of the open space. (Less than Significant) *[Criterion F.a]***

Project structures would range from 40 feet up to 420 feet in height would extend above surrounding buildings and would cast shadows on nearby public open space. The proposed building heights would be 40 feet near the shoreline of Candlestick Point, with buildings exceeding 40 feet and extending to 85 feet throughout the majority of the rest of the Candlestick Point site. Buildings between 85 feet and 140 feet in height would be located in the central part of the site. The Project would also include up to ten residential towers ranging from 220 feet to 420 feet in height as shown on Figure II-5 (Proposed Maximum Building Heights). Project plans have identified the locations of towers, but tower designs are preliminary. The length and duration of shadows cast would be influenced by elements of building design, such as building height, shape, massing, and setbacks.

Figure III.F-3 through Figure III.F-14 show shadow conditions at Candlestick Point with the Project at 10:00 A.M., noon, and 3:00 P.M. Pacific Standard Time (PST) on December 21 and March 21, and Pacific Daylight Time (PDT) on June 21 and September 21. December 21(Winter Solstice), 10:00 A.M.

December 21 (Winter Solstice), 10:00 A.M.

As shown in Figure III.F-3 (Candlestick Point: Shadow Patterns—December 21 [10 AM PST]), on December 21, the Project would cast new shadow on approximately 5 percent of Gilman Park along the southeastern border. As noted above, new shadows cast on Gilman Park would be from Project buildings that would not exceed 40 feet in height and are, therefore, not subject to Section 295 of the *Planning Code*. Gilman Park includes a playground, a softball diamond, and a dog run area. The park has mature trees along its perimeter. On the basis of available observations of Gilman Park, the park is primarily used during midday and afternoon periods, by neighborhood residents and students at adjacent Bret Hart Harte Elementary School. The park is relatively less patronized in morning hours. Therefore, Project shadows on limited areas of the park in morning hours would not adversely affect the use of the park, and would not be considered significant adverse shadow impacts.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — DECEMBER 21 (10 AM PST)

FIGURE III.F-3

The Project would not shade Bayview Park at this time.

The Project would shade less than 1 percent of the CPSRA at this time.

The Project parks and open space would receive shadow on the winter solstice. The Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, Bayview Gardens/Wedge Park, and Mini-Wedge Park would have shadow on approximately 15 percent, 51 percent, 79 percent, and 17 percent of their areas, respectively. The relatively narrow Alice Griffith Neighborhood Park would be shaded by buildings on the southwestern boundary of the park. The 22-story tower southeast of Candlestick Point Neighborhood Park would cast shade on the northeast portion of that park.

December 21 (Winter Solstice), Noon

As shown in Figure III.F-4 (Candlestick Point: Shadow Patterns—December 21 [Noon PST]), the Project would not shade Gilman Park or Bayview Park at this time.

New shadow on the CPSRA would be approximately 2 percent with new shadow being cast by a 27-story residential tower.

The relatively low angle of the winter sun would cast shadow on Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, Bayview Gardens/Wedge Park and Mini-Wedge Park, approximately 37 percent, 12 percent, 37 percent, and 46 percent of their area, respectively.

December 21 (Winter Solstice), 3:00 P.M.

As shown in Figure III.F-5 (Candlestick Point: Shadow Patterns—December 21 [3 PM PST]), as the afternoon progresses, the Project would not shade Gilman Park or Bayview Park at this time.

New shadow would cover approximately 12 percent of the CPSRA, primarily in the northerly area. The Project would shade about 4 percent of Yosemite Slough lands outside the Project site.

Approximately 85 percent, 24 percent, 1 percent, and 86 percent respectively of Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, Bayview Gardens/Wedge Park, and Mini-Wedge Park would be affected by Project shadow.

The Hillside Open Space along Jamestown Avenue would have approximately 15 percent of shade in the northernmost area.

March 21 (Vernal Equinox), 10:00 A.M.

As shown in Figure III.F-6 (Candlestick Point: Shadow Patterns—March 21 [10 AM PST]), new shadow would be cast on less than 1 percent of Gilman Park along the southeastern fringe. As noted above, new shadows cast on Gilman Park would be from Project buildings that would not exceed 40 feet in height and are, therefore, not subject to *Planning Code* Section 295. As noted above, Gilman Park is primarily used during midday and afternoon periods, by neighborhood residents, and students at adjacent Bret Hart Harte Elementary School. The park is relatively less patronized in morning hours. Therefore, Project shadows on limited areas of the park in morning hours would not adversely affect the use of the park, and would not be considered significant adverse shadow impacts.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — DECEMBER 21 (NOON PST)

FIGURE III.F-4

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS —DECEMBER 21 (3 PM PST)

FIGURE III.F-5

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — MARCH 21 (10 AM PST)

FIGURE III.F-6

The Project would not shade Bayview Park at this time.

Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, and Bayview Gardens/Wedge Park would have shadow cast on approximately 10 percent, 21 percent, and 51 percent, respectively. This would affect the southern section of Alice Griffith Neighborhood Park, a central portion of Candlestick Point Neighborhood Park, and Bayview Gardens/Wedge Park along its length.

March 21 (Vernal Equinox), Noon

As shown in Figure III.F-7 (Candlestick Point: Shadow Patterns—March 21 [Noon PST]), the Project would not shade Gilman Park or Bayview Park at this time.

The Project would shade less than 1 percent of the CPSRA at this time.

Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, Bayview Gardens/Wedge Park, and Mini-Wedge Park would have shadow on approximately 12 percent, 4 percent, 26 percent, and 7 percent, respectively.

March 21 (Vernal Equinox), 3:00 P.M.

Refer to Figure III.F-8 (Candlestick Point: Shadow Patterns—March 21 [3 PM PST]). The Project would not shade Gilman Park or Bayview Park at this time.

At CPSRA, approximately 1 percent would be affected by new shadow cast by a 27-story residential tower.

The low angle of the spring sun in the afternoon sky would cast shadow on Alice Griffith Neighborhood Park and Mini-Wedge Park, 17 percent, and 42 percent, respectively.

The Hillside Open Space would be approximately 6 percent shaded, primarily in the northernmost section.

June 21 (Summer Solstice), 10:00 A.M.

As shown in Figure III.F-9 (Candlestick Point: Shadow Patterns—June 21 [10 AM PDT]), the Project would not shade Gilman Park or Bayview Park at this time.

Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, Bayview Gardens/Wedge Park, and Mini-Wedge Park would have shade on approximately 9 percent, 5 percent, 14 percent, and 15 percent of their area, respectively.

June 21 (Summer Solstice), Noon

By midday, the sun would be at its highest points and cause limited shadows. As shown in Figure III.F-10 (Candlestick Point: Shadow Patterns—June 21 [Noon PDT]), the Project would not shade Gilman Park or Bayview Park at this time.

The Project would not shade the CPSRA at this time.

Alice Griffith Neighborhood Park and Bayview Gardens/Wedge Park would have shadow on approximately 7 percent and 5 percent of their area, respectively.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — MARCH 21 (NOON PST)

FIGURE III.F-7

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — MARCH 21 (3 PM PST)

FIGURE III.F-8

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — JUNE 21 (10 AM PDT)

FIGURE III.F-9

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT: SHADOW PATTERNS — JUNE 21 (NOON PDT)

FIGURE III.F-10

June 21 (Summer Solstice), 3:00 P.M.

As shown in Figure III.F-11 (Candlestick Point: Shadow Patterns—June 21 [3 PM PDT]), the Project would not shade Gilman Park or Bayview Park at this time.

The Project would shade less than 1 percent of the CPSRA at this time.

There would be shadow on approximately 9 percent of Alice Griffith Neighborhood Park and about 8 percent of Mini-Wedge Park.

September 21 (Autumnal Equinox), 10:00 A.M.

New shadow would be cast on less than 1 percent of Gilman Park along the southeastern fringe. As noted above, new shadows cast on Gilman Park would be from Project buildings that would not exceed 40 feet in height and are, therefore, not subject to *Planning Code* Section 295. As noted above, Gilman Park is primarily used during midday and afternoon periods, by neighborhood residents, and students at adjacent Bret Hart Harte Elementary School. The park is relatively less patronized in morning hours. Therefore, Project shadows on limited areas of the park in morning hours would not adversely affect the use of the park, and would not be considered significant adverse shadow impacts. Refer to Figure III.F-12 (Candlestick Point: Shadow Patterns—September 21 [10 AM PDT]).

Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, and Bayview Gardens/Wedge Park would have shadow on approximately 10 percent, 21 percent, and 51 percent of their area, respectively. Shadow would fall on the southern portion of Alice Griffith Neighborhood Park and on the central area of Candlestick Point Neighborhood Park while the residential towers east of Bayview Gardens/Wedge Park would cast shade along its length.

September 21 (Autumnal Equinox), Noon

As shown in Figure III.F-13 (Candlestick Point: Shadow Patterns—September 21 [Noon PST]), the Project would not shade Gilman Park or Bayview Park at this time.

The Project would shade less than 1 percent of the CPSRA at this time.

Alice Griffith Neighborhood Park, Candlestick Point Neighborhood Park, Bayview Gardens/Wedge Park, and Mini-Wedge Park would have shadow on approximately 12 percent, 4 percent, 26 percent, and 7 percent, respectively. Shadow would be cast on sections of Bayview Gardens/Wedge Park by the 32-story residential tower to its south and the twenty-one-story residential tower on its northern. Mini-Wedge Park would be similarly affected by shade due to the 30-story residential tower to its west.

September 21 (Autumnal Equinox), 3:00 P.M.

As shown in Figure III.F-14 (Candlestick Point: Shadow Patterns—September 21 [3 PM PDT]), the Project would not shade Gilman Park or Bayview Park at this time.

At CPSRA, approximately 1 percent would be affected by new shadow cast by a 27-story residential tower.

The low angle of the spring sun in the afternoon sky would cast shadow on Alice Griffith Neighborhood Park and Mini-Wedge Park, 17 percent, and 42 percent, respectively.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — JUNE 21 (3 PM PDT)

FIGURE III.F-11

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — SEPTEMBER 21 (10 AM PDT)

FIGURE III.F-12

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — SEPTEMBER 21 (NOON PDT)

FIGURE III.F-13

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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CANDLESTICK POINT: SHADOW PATTERNS — SEPTEMBER 21 (3 PM PDT)

FIGURE III.F-14

The Hillside Open Space would be approximately 6 percent shaded, primarily in the northernmost section.

Conclusions

Effects on SFRPD Open Space

The existing SFRPD open space in the Project vicinity, including Gilman Park and Bayview Park would have limited shadow effects from the Project. Gilman Park would not experience shading from Project structures exceeding 40 feet in height; consequently, any shadows cast by Project buildings would not be subject to *Planning Code* Section 295. On the basis of available observations of Gilman Park, the park is primarily used during midday and afternoon periods, by neighborhood residents, and students from adjacent Bret Hart Harte Elementary School. The park is relatively less patronized in morning hours. Therefore, Project shadows on limited areas of the park in morning hours would not adversely affect the use of the park, and would not be considered significant adverse shadow impacts.

The Project would shade an area of Bayview Park that does not provide any active uses, and is relatively steep. Based on Figure III.F-2, the Project would only shade Bayview Park during the first hour after sunrise in spring, summer, and fall months, and would not create any new shadow by 10:00 A.M. at any time of year. This would not be considered a significant adverse shadow impact.

Effects on CPSRA Open Space

The CPSRA would be affected by new shade in the afternoons, but most areas would experience limited to no new shadow from the Project. Other areas of the CPSRA would largely continue to remain in sun throughout the year. Project shadow would not interfere with the public's use or enjoyment of the CPSRA. Activities in these areas, such as windsurfing launching, walking, jogging, and fishing, would not be affected by the new shade.

Effects on New Project Open Space

Shadows cast by the Project on proposed new parks throughout the year would range from little or no shading to large areas of certain parks receiving new shade, particularly in the late afternoon during the vernal and autumnal equinoxes. The orientation of the relatively narrow Alice Griffith Neighborhood and Mini-Wedge Parks with respect to the path of the sun and the close proximity of Project buildings along the parks' southwestern boundaries combine to make them most susceptible to new shade.

Overall, given the heights, layouts, and orientations of the Project buildings, the neighborhood parks would experience variable levels of shading throughout the day, generally receiving some new shade from morning until noon in spring, summer, and fall with a less increase in the afternoons in winter, spring, and fall. Public use of these proposed new parks would not be expected to be adversely affected by the shade conditions.

The extent and duration of shadow on new public sidewalks would increase along street corridors in the Project. However, this new shadow would not be in excess of that which would be expected in a highly urban area.

Development at Candlestick Point would have less-than-significant shadow effects on use of existing and proposed open space. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact SH-1b **Implementation of the Project at HPS Phase II would not result in new structures with the potential to cast shadows on existing or proposed parks and open space in a manner that would have an adverse effect on the use of the open space. (Less than Significant) *[Criterion F.a]***

The proposed building heights would be 65 feet in most portions of HPS Phase II, with 85 to 105 foot limits farther east. The Project would include up to two residential towers ranging from 270 to 370 feet. The new 49ers Stadium would be approximately 156 feet to the top row of seating. HPS Phase II would include new open space at Grasslands Ecology Park, Dual-Use Sports Fields and Multi-Use Lawn near the proposed 49ers stadium, the Waterfront Recreation Pier, the Waterfront Promenade, Heritage Park, and Northside Park.

The HPS Phase II buildings would not add shade to existing SFRPD public open space in the Project vicinity throughout the year (Figure III.F 15 [Hunters Point Shipyard Phase II: Proposed Project Year-Round Shadow Trace]). These include India Basin Shoreline Park and India Basin Open Space. No Project structure in excess of 40 feet in height would be sufficiently close to these parks to create shadow effects on them (refer to Figure II-5 [Proposed Maximum Building Heights]). The HPS Phase II buildings would also not shade to existing CPSRA lands. Thus, the discussion of HPS Phase II shadow effects below presents information on Project effects on open space proposed in the Project itself.

December 21 (Winter Solstice), 10.00 A.M.

The Project would cast new shadow on Grasslands Ecology Park at Hunters Point Parcel E-2, on approximately 1.7 percent of its area in the northeast part of the park along Crisp Road. Refer to Figure III.F-16 (Hunters Point Shipyard Phase II: Shadow Patterns—December 21 [10 AM PST]).

Heritage Park and the Waterfront Promenade would be shaded on approximately 17 percent and 3.3 percent of their areas, respectively. The new shade in Heritage Park would occur primarily on the northern side. New shadow on Waterfront Promenade would occur along the southern flank toward the middle of the park.

The Hillside Parks and Open Space at HPS Phase II would be affected by new shadow on approximately 7 percent of its eastern boundary

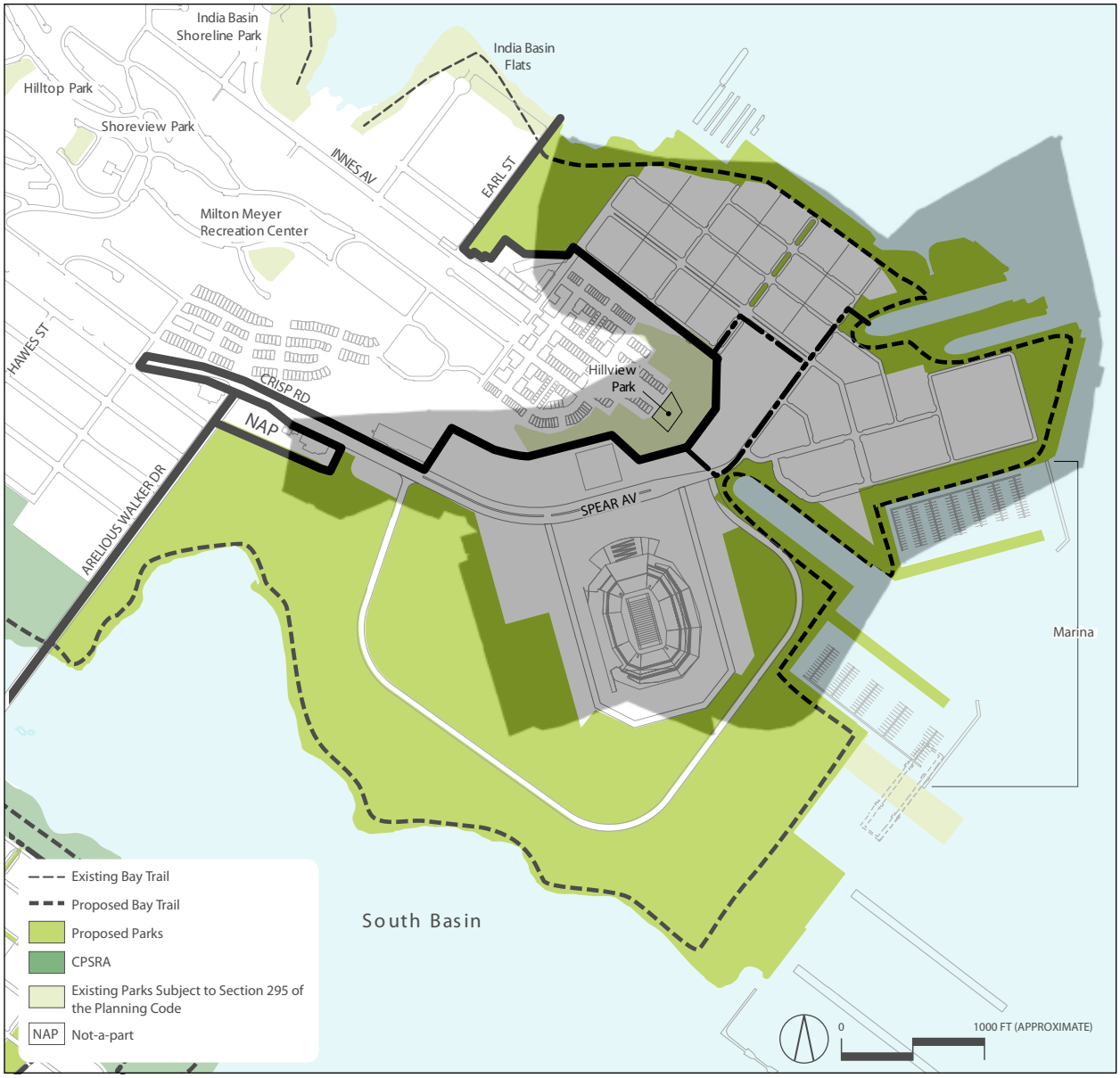
December 21 (Winter Solstice), Noon

As shown in Figure III.F-17 (Hunters Point Shipyard Phase II: Shadow Patterns—December 21 [Noon PST]), the Project would add shadow to approximately 2 percent of Grasslands Ecology Park in the area of the park along Crisp Road.

The Project would add shadow to approximately 14 percent of Heritage Park.

December 21 (Winter Solstice), 3:00 P.M.

As shown in Figure III.F-18 (Hunters Point Shipyard Phase II: Shadow Patterns—December 21 [3 PM PST]), The Project would cast shadows on about 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 near Crisp Road. The Project would cast shadows across Heritage Park and Waterfront Promenade, on approximately 28 percent and 3 percent, respectively.



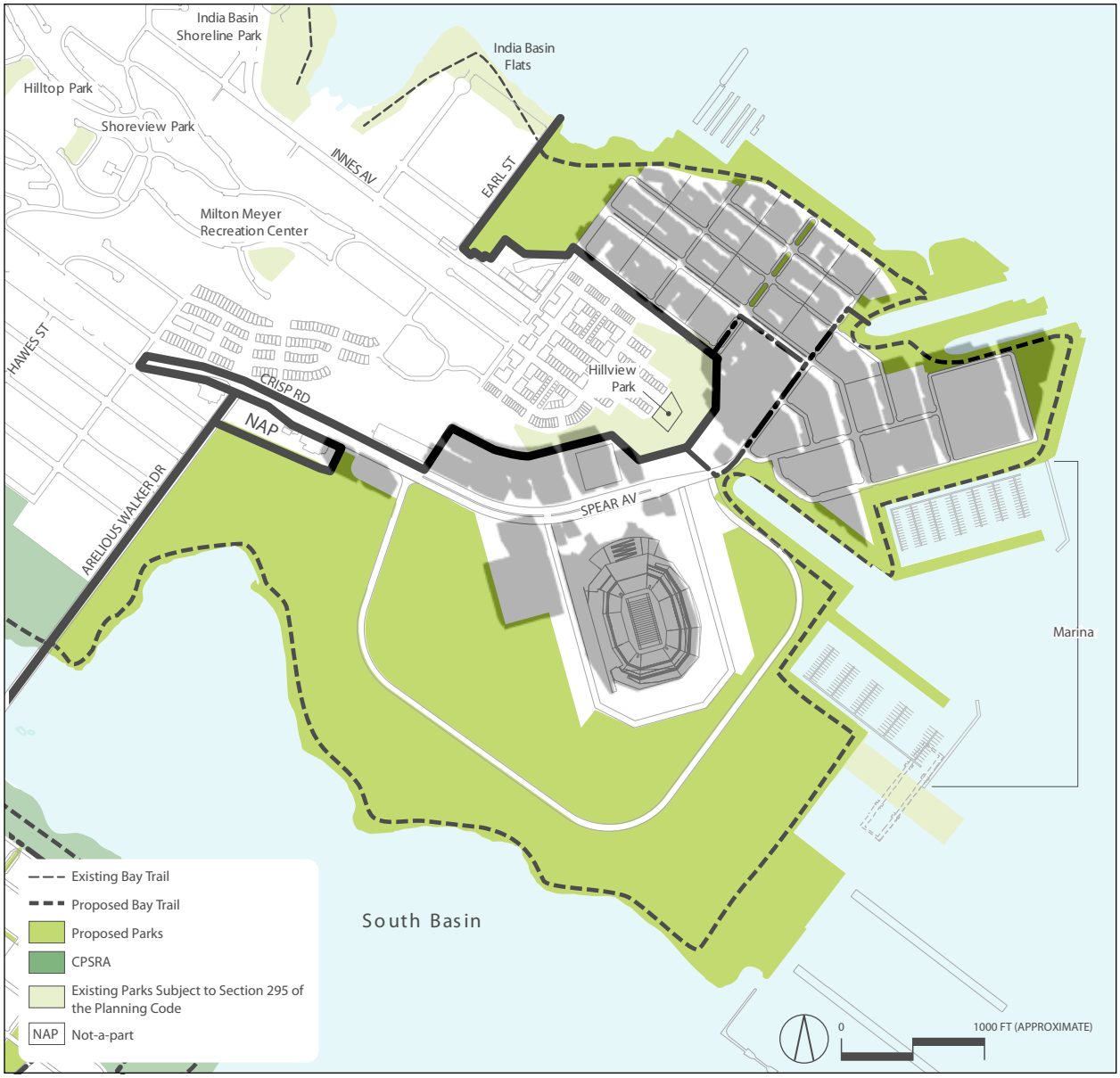
SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-15

HUNTERS POINT SHIPYARD PHASE II:
PROPOSED PROJECT YEAR-ROUND SHADOW TRACE



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-16

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — DECEMBER 21 (10 AM PST)

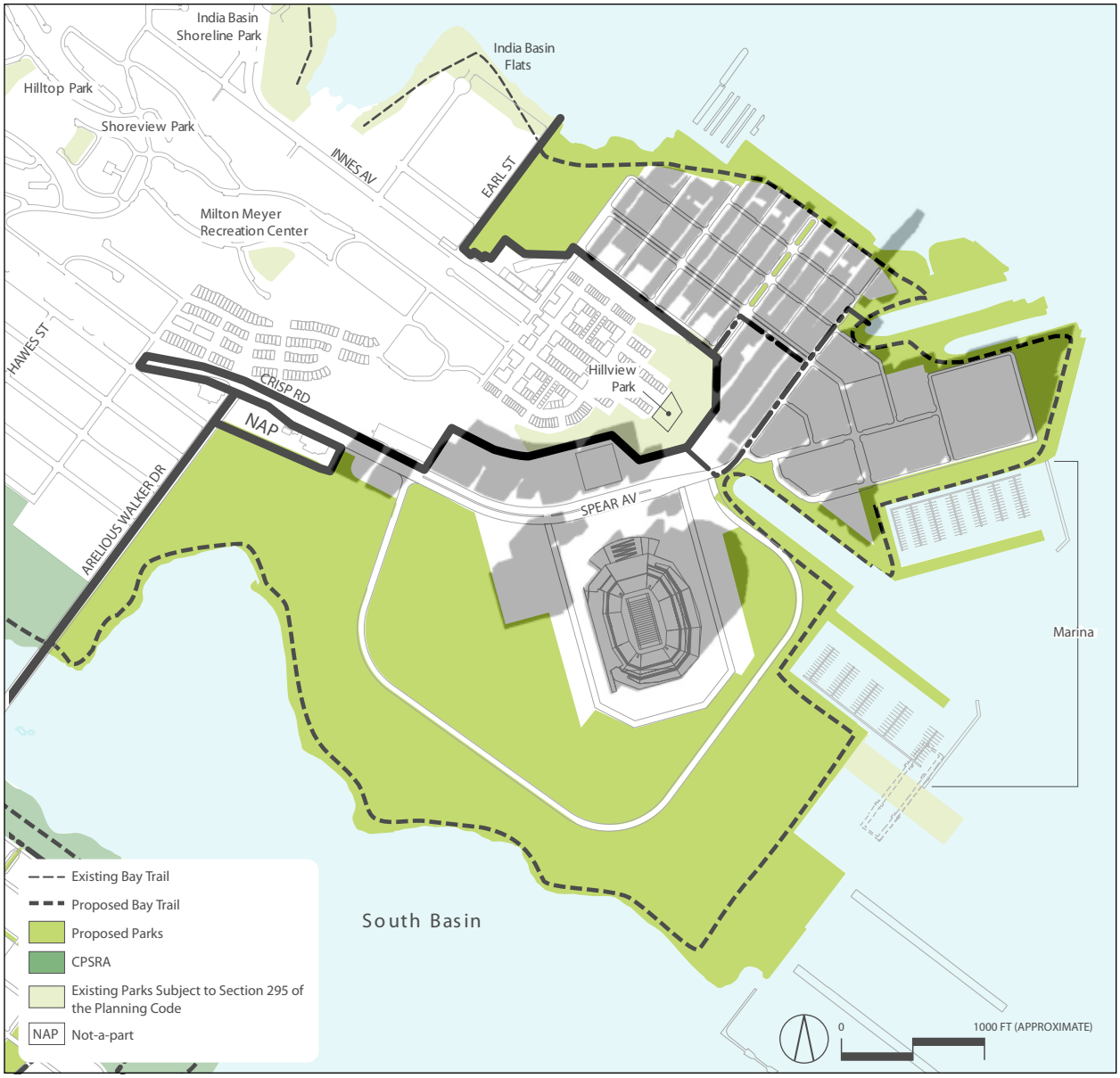
SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-17

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — DECEMBER 21 (NOON PST)



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-18

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — DECEMBER 21 (3 PM PST)

The 49ers stadium would shade a small portion of the Sports and Recreation Fields northeast of the stadium. The Project would cast shadows on approximately 6 percent of the Hillside Open Space at HPS Phase II.

March 21 (Vernal Equinox), 10:00 A.M.

As shown in Figure III.F-19 (Hunters Point Shipyard Phase II: Shadow Patterns—March 21 [10 AM PST]), the Project would cast shadow on Grasslands Ecology Park at Hunters Point Parcel E-2, on approximately 2 percent of its area along Crisp Road. The Project would cast new shadows on approximately 2 percent of Heritage Park. The Project would cast shadows on approximately 7 percent on of the Hillside Parks and Open Space in HPS Phase II along its eastern boundary.

March 21 (Vernal Equinox), Noon

As shown in Figure III.F-20 (Hunters Point Shipyard Phase II: Shadow Patterns—March 21 [Noon PST]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road. The Project would cast new shadows on approximately 4 percent of Heritage Park.

March 21 (Vernal Equinox), 3:00 P.M.

As shown in Figure III.F-21 (Hunters Point Shipyard Phase II: Shadow Patterns—March 21 [3 PM PST]), the Project would cast shadows on about 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 near Crisp Road. The Project would cast shadows across Heritage Park and Waterfront Promenade, on approximately 26 percent and 3 percent, respectively. The Project would cast shadows on approximately 6 percent of the Hillside Parks and Open Space in HPS Phase II along its eastern boundary.

June 21 (Summer Solstice), 10:00 A.M.

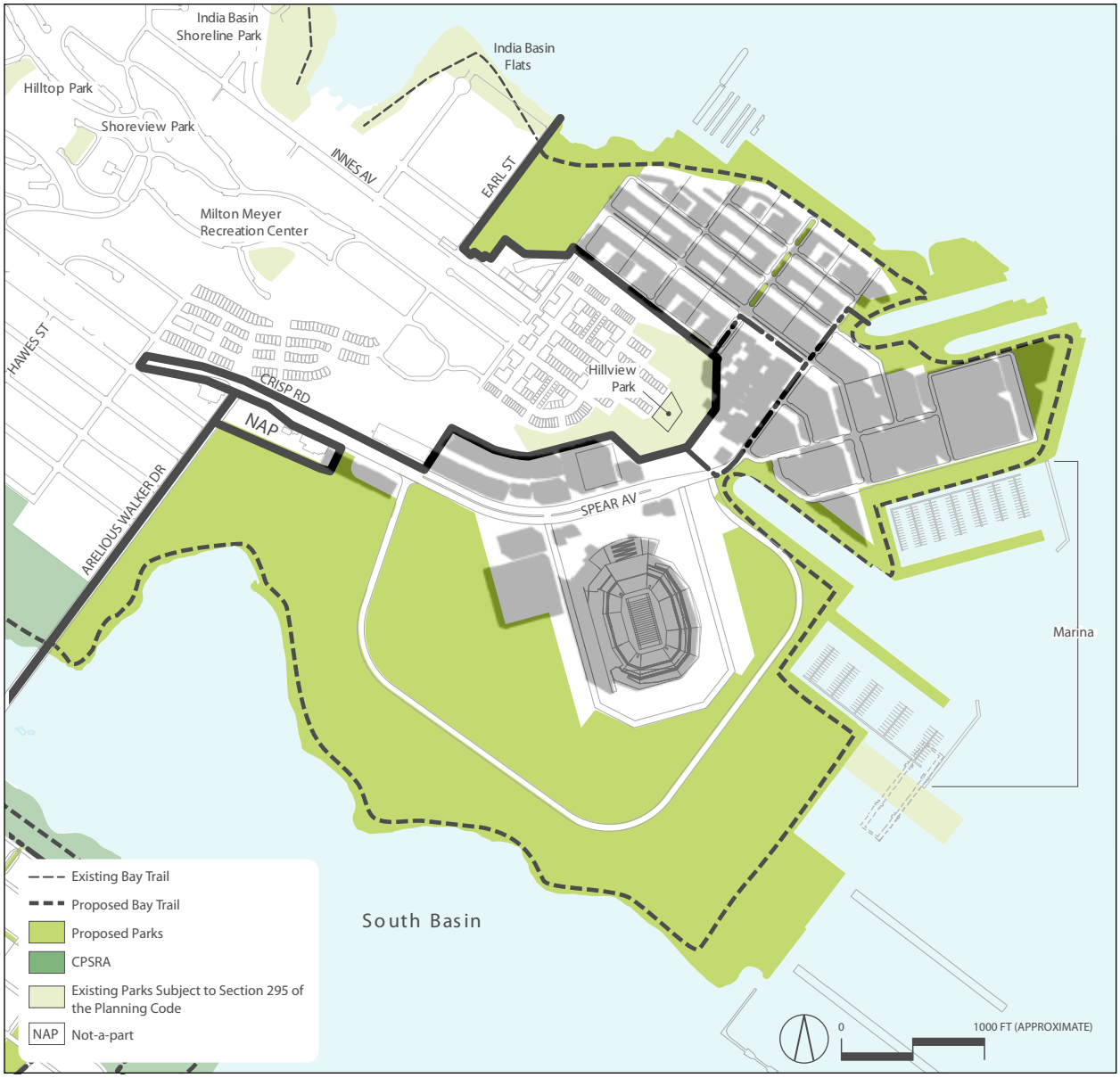
As shown in Figure III.F-22 (Hunters Point Shipyard Phase II: Shadow Patterns—June 21 [10 AM PDT]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road. The Project would cast new shadows on approximately 4 percent of Heritage Park. The Project would cast shadows on approximately 4 percent of the Hillside Parks and Open Space in HPS Phase II along its eastern boundary.

June 21 (Summer Solstice), Noon

As shown in Figure III.F-23 (Hunters Point Shipyard Phase II: Shadow Patterns—June 21 [Noon PDT]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road. The Project would cast shadows on approximately 2 percent of Heritage Park.

June 21 (Summer Solstice), 3:00 P.M.

As shown in Figure III.F-24 (Hunters Point Shipyard Phase II: Shadow Patterns—June 21 [3 PM PDT]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road, and on approximately 2 percent of Heritage Park.



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-19

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — MARCH 21 (10 AM PST)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-20

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — MARCH 21 (NOON PST)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-21

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — MARCH 21 (3 PM PST)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-22

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — JUNE 21 (10 AM PDT)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-23

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — JUNE 21 (NOON PDT)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-24

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — JUNE 21 (3 PM PDT)

September 21 (Autumnal Equinox), 10:00 A.M.

As shown in Figure III.F-25 (Hunters Point Shipyard Phase II: Shadow Patterns—September 21 [10 AM PDT]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road, and on approximately 6 percent of Heritage Park. The Project would cast shadows on approximately 6 percent of the Hillside Parks and Open Space in HPS Phase II along its eastern boundary.

September 21 (Autumnal Equinox), Noon

As shown in Figure III.F-26 (Hunters Point Shipyard Phase II: Shadow Patterns—September 21 [Noon PDT]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road. The Project would cast shadows on approximately 3 percent of Heritage Park.

September 21 (Autumnal Equinox), 3:00 P.M.

As shown in Figure III.F-27 (Hunters Point Shipyard Phase II: Shadow Patterns—September 21 [3 PM PDT]), the Project would cast shadows on approximately 2 percent of Grasslands Ecology Park at Hunters Point Parcel E-2 along Crisp Road. The Project would cast new shadows on approximately 20 percent of Heritage Park. The Project would cast shadows on approximately 5 percent of the Hillside Parks and Open Space in HPS Phase II along its eastern boundary.

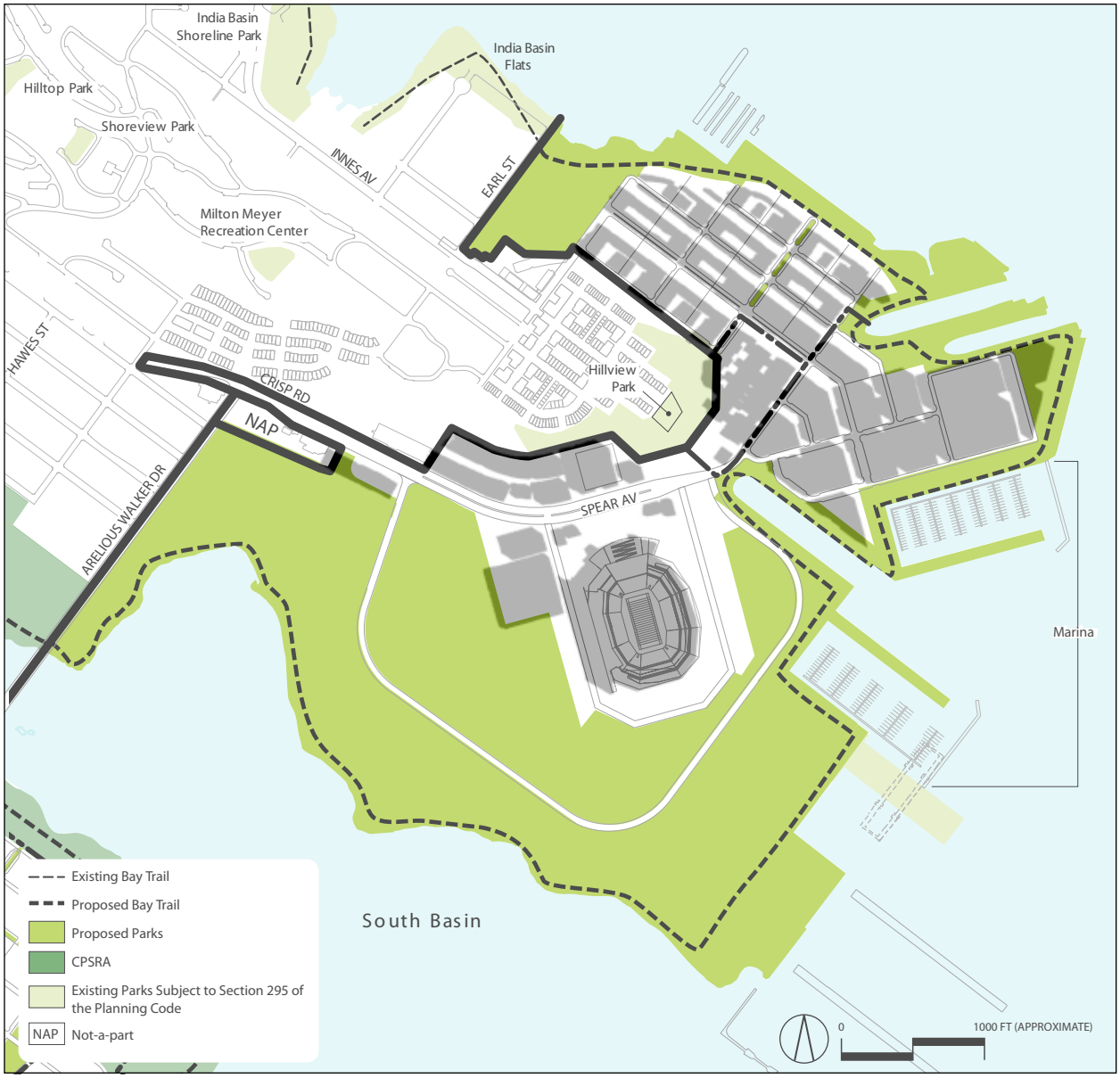
Conclusions

SFRPD open space in the vicinity of HPS Phase II includes India Basin Shoreline Park and India Basin Open Space. HPS Phase II would not add shade to existing SFRPD open space in the Project vicinity throughout the year.

The majority of proposed public open space at HPS Phase II would experience little to no new shade throughout the year. Heritage Park, due to its waterfront location to the east of the Project, would experience up to 27 percent new shade from the afternoon sun throughout the year however use of this resource is not expected to be adversely affected.

The extent and duration of shadow on new public sidewalks could increase along new street corridors in the Project. However, this shadow would not be in excess of that which would be expected in a highly urban area.

Development of HPS Phase II would have less-than-significant shadow effects on use of existing and proposed open space. No mitigation is required.



SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-25

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — SEPTEMBER 21 (10 AM PDT)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-26

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — SEPTEMBER 21 (NOON PDT)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.F-27

HUNTERS POINT SHIPYARD PHASE II:
SHADOW PATTERNS — SEPTEMBER 21 (3 PM PDT)

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact SH-1 **Implementation of the Project would not result in new structures with the potential to cast shadows on existing or proposed parks and open space in a manner that would have an adverse effect on the use of the open space. (Less than Significant) *[Criterion F.a]***

As shown by Figure III.F-3 through Figure III.E-27 and the accompanying discussions, above, the Project would add shade to existing and proposed open space. The new shade would occur at limited times of day and year, and would not substantially affect the use of outdoor recreational facilities or open space. The impact would be less than significant. No mitigation is required. Refer to the discussions of Impact SH-1a and Impact SH-1b, above.

Cumulative Impacts

The geographic context for an analysis of cumulative new shadow impacts on outdoor recreation facilities or other public space is limited to the immediate Project site and vicinity. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development in this geographic area includes approved or under construction development as part of the Yosemite Slough Restoration Project, at Hunters Point Phase I, proposed development at Executive Park, and future development at India Basin Shoreline Area C. Such development could include structures that would add shade to existing public open space, or to Project open space. A significant impact would result if cumulative development combined to create new shade on open space that would have a substantial adverse effect on the use of the open space.

Because of the extent of the Project site encompassing the Candlestick Point and HPS Phase II site, cumulative development outside the Project site would be relatively distant from the Project open space or CPSRA and would not have the potential to combine with the Project to create new shadows on open spaces within the Project site.

Reasonably foreseeable development would include future projects in this geographic area. Structures over 40 feet in height could have shadow effects on open space under the jurisdiction of SFRPD. Such projects could affect shading of Bayview Park or Gilman Park. However, *Planning Code* Section 295 would require that such proposed development could not be approved unless the Planning Commission found that the project would have an insignificant effect on the use of the park. This would avoid significant cumulative shadow effects on SFRPD open space. In addition, the analysis found that the Project would not have significant adverse shadow effects on SFRPD open space at Gilman Park or Bayview Park, and would have no effect on shadow conditions at SFRPD sites at India Basin Shoreline Park or India Basin Flats; therefore, the Project would not contribute to any cumulative effects on SFRPD open space.

The shadow analysis has determined that the extent and duration of new shadow cast by the Project on public open space would not substantially affect outdoor recreation facilities or other public facilities, including the newly restored Yosemite Slough when that project is completed. The analysis did not identify potential cumulative shadow effects from other potential development. Therefore, the Project would not result in considerable contribution to cumulative impacts with respect to shadows on open space.

SECTION III.G WIND

III.G.1 Introduction

This section of the EIR discusses the existing wind conditions on and around the Project site and identifies factors that determine wind exposure and changes that would result in adverse effects on pedestrian-level wind. Wind conditions can affect pedestrian safety. The analysis in this section uses wind data from studies in the Project vicinity, historic climate data, and the Final Preliminary Pedestrian Wind Assessment prepared for the Project (CPP, Inc. 2007, 2008 Addendum; refer to Appendix G). This section identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts. Project and cumulative wind conditions that could affect offshore recreation activities, such as windsurfing in the Bay near the Project site, are discussed in Section III.P (Recreation).

III.G.2 Setting

Planetary wind systems, normally called prevailing winds, are great moving air masses that dominate whole areas and show constant directional characteristics, varying only with the movement of high or low-pressure systems and with the seasons of the year. In many locations these are the dominant winds, particularly on exposed hilltops, shorelines facing the prevailing winds, an open plain, or plateau; the floor of an open valley running parallel to the prevailing winds, or the windward side of a gently sloping hill.[142] Local winds, by contrast, are caused by temperature differences created by local topographic conditions. Land-sea breezes, for example, will blow from the land towards the sea by night, simply because land temperatures are more subject to change than the great mass of the ocean. Mountain and valley breezes are caused by the same local effects. On a warm sunny day, winds may rise strongly off the floor of a valley and up the slopes of adjacent hills.[143]

Long-term wind data in San Francisco are available from historical wind gauge records from the US Weather Bureau weather station above the old Federal Building at 50 United Nations Plaza and San Francisco International Airport (SFO). Everyday wind climatology is defined using wind statistics of anemometers (that measure wind speed) in the northern portion of the San Francisco Bay. Limited wind data is also available from wind data recorded at HPS as part of *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) monitoring.[144] For wind analysis along the San Francisco Peninsula, it is customary to use data from SFO. HPS and downtown Civic Center data indicate a lesser influence of northwesterly winds than at SFO. The SFO data is affected by wind northwesterly through the San Bruno Gap in San Mateo County about four miles south of the Project site.

Existing development on the Candlestick Point site includes the Candlestick Park stadium and associated paved parking areas, the CPSRA, a recreational vehicle park on Gilman Avenue, and 256 housing units on the Alice Griffith public housing site. The HPS Phase II site includes many structures associated with ship repair, piers, dry-docks, ancillary storage, administrative, and other former Navy uses, largely from the

[142] Butz, Stephen D., *Science of Earth Systems*, Cengage Learning, 2007.
[143] Butz, Stephen D., 2007.
[144] Refer to Section III.K (Hazards and Hazardous Materials) for description of the CERCLA monitoring process required as part of the Navy Hunters Point Shipyard remediation effort.

World War II era. Most structures are vacant. The only structure on the Project site greater than 100 feet tall is Candlestick Park stadium, which is approximately 120 feet tall. The Alice Griffith housing consists of 33 two-story, rectangular apartment buildings sited on a small hill overlooking surrounding development. Bayview Hill rises immediately west of Jamestown Avenue, west of and uphill from the stadium. Existing development on the HPS Phase II site consists of shipyard structures ranging from one to nine stories in height. The topography of HPS is generally flat, except for the area around Building 101 at the lower slope of Hunters Point Hill (refer to Figure II-2 [Project Site and Context]).

Wind Patterns

Wind patterns at SFO indicate that the dominant wind direction is west-northwest, with winds coming out of this direction 23 percent of the time. Two-thirds of winds from this direction exceed 12 miles per hour (mph). Winds come from directly west and northwest 13 percent of the time each, so that these three wind directions (west, northwest, and west-northwest) account for roughly half of the wind patterns.[145] Although reliable wind data indicate that the dominant wind direction at SFO is west-northwest, it should be noted that the dominant wind direction is known to shift with locations around the Bay, including at the Project site.[146]

Winds can fluctuate greatly depending on the time of year and the time of day. During the winter months winds change markedly, becoming milder and less dominated by the west-northwesterly winds. Winds also change significantly during the day, typically intensifying from late morning until reaching an average peak of 20 knots (23 mph) in the late afternoon, diminishing in the evening. High winds in the San Francisco Bay are most common in the late afternoon between March and October.[147]

Wind data were recorded over a 16-month period from the anemometer at HPS. Those data indicate a dominance of westerly winds, a result of local topography. On the basis of available data from the sources noted above, the predominant wind directions affecting the Project site would be westerly and west-northwesterly. Given the sensitivity of street orientation to wind direction, additional data were obtained for a three-month period from downtown San Francisco wind monitoring, which data were overlain with the SFO data. These data indicate that winds from the northwest are of less concern than winds from directly west.[148]

Hunters Point and Candlestick Point are known to be windy locations. Wind conditions at Candlestick Point and Hunters Point are influenced by the presence of the Bayview Hill and Hunters Point Hill, both of which are directly upwind of the Project site for prevailing westerly winds. These hills tend to accelerate the wind and change its direction from west towards west-northwest, resulting in eddying (a circular motion of wind that interrupts the flow and causes turbulence), resulting in gustiness (wind speeds that momentarily increase in speed). Accelerated wind flows around these hills are most pronounced at the crests and near the slopes. For dominant west winds, the primary location of concern in the Project vicinity is at the south end of the hills. The average wind speed east of these hills would be expected to be somewhat reduced, with increased turbulence because of the variable wind speed.[149]

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145 CPP, Inc., *Final Report, Preliminary Pedestrian Wind Assessment Candlestick Point and Hunters Point Developments, San Francisco California*, June 2007. (CPP, Inc., June 2007).
146 CPP, Inc., June 2007.
147 CPP, Inc., June 2007.
148 CPP, Inc., *June, 2007*.
149 CPP, Inc., *June, 2007*.

The full effects of the hills on local wind patterns are difficult to predict. However, one identifiable effect is that Candlestick Point is in the wake (a downwind area of weak wind caused by a "split" of wind around a substantial obstacle) of Bayview Hill. During most afternoons and evenings from spring to fall, wake areas tend to feature lower mean wind speeds but higher turbulence or gustiness. The wake effect typically diminishes with distance from the hill. The wake effect below Hunters Point Hill is less pronounced than the same effect below Bayview Hill because of its lower elevation.[150]

An example of the wind effects in the Project vicinity are the wind conditions at the existing Candlestick Park Stadium. A wind tunnel study of Candlestick Park performed shortly after the existing stadium was built revealed that the turbulence resulting from Bayview Hill causes wind gusting problems at Candlestick Park stadium. This study also noted that many of the wind problems experienced in the stadium could have been avoided if the stadium and the parking lot locations had been reversed, because that would have placed the stadium farther away from the wake area of Bayview Hill, where the effect would be diminished compared to its current location. This would have resulted in a decrease in gustiness at the stadium.[151]

Wind Effects

Winds vary at pedestrian levels within an urban area. In San Francisco, wind speeds are generally greater, on average, along streets that run east/west, as buildings are oriented with respect to the prevailing wind direction such that they tend to funnel winds along this street orientation. Wide streets bordered by tall buildings are especially vulnerable to wind funneling. The impact of wind funneling can often be reduced by the presence of tall, bushy trees along streets susceptible to wind to force the wind to stay above street level. Streets running north-south tend to have lighter winds, on average, due to the shelter from prevailing winds offered by buildings on the west side of the street. Winding streets that do not follow a grid pattern also tend to have lighter winds at pedestrian level, as the building orientations generally keep high winds above the buildings.[152]

Wind conditions can affect pedestrian safety on sidewalks and in other public areas. Winds up to 4 mph have no noticeable effect on pedestrians. Winds from 4 to 8 mph are felt on the face. Winds from 8 to 13 mph disturb hair, cause clothing to flap, and extend a light flag mounted on a pole. Winds from 13 to 19 mph raise loose paper, dust and dry soil, and disarrange hair. The force of winds from 19 to 26 mph is felt on the body. With winds of 26 to 34 mph, umbrellas are used with difficulty, hair is blown straight, walking steadily is difficult, and wind noise is unpleasant. Winds over 34 mph make it difficult for a person to maintain balance, and gusts can blow a person over.[153]

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[150] CPP, Inc., *June, 2007.*

[151] Cermak, J.E., Malhotra, R. C., and Plate, E. J., "Investigation of the Candlestick Park Wind Problem – Vol. II: Wind-Tunnel Model Study," Technical Report CER63JEC-RCM-EJP27, Fluid Mechanics Program, Colorado State University, Fort Collins, Colorado, July 1963.
Garrison, J.A., "Wind-Tunnel Studies of Winds in Candlestick Park," Technical Report CER70-71JAG-JEC5, Fluid Mechanics Program, Colorado State University, Fort Collins, Colorado, May 1970.

[152] CPP, Inc., June 2007.

[153] Lawson, T.V. and A.D. Penwarden, "The Effects of Wind on People in the Vicinity of Buildings," Proceedings of the Fourth International Conference on Wind Effects on Buildings an Structures, London, 1975, Cambridge University Press, Cambridge, U.K., 605-622 1976.

III.G.3 Regulatory Framework

Federal

There are no applicable federal regulations relating to wind.

State

There are no applicable state regulations relating to wind.

Local

San Francisco Planning Code

The *San Francisco Planning Code* (*Planning Code*) establishes wind comfort and wind hazard criteria used to evaluate new development in four areas of the City: the C-3 Downtown Commercial Districts (Section 148), the Van Ness Avenue SUD (Section 243(c)(9)), the Folsom-Main Residential/Commercial SUD (Section 249.1), and the Downtown Residential District (Section 825). As none of these areas includes the Project site, the wind comfort and wind hazard criteria established in the *Planning Code* would not be applicable. The cited *Planning Code* sections provide that any new building or addition in these areas of the City that would cause wind speeds to exceed the hazard level of 26-mph-equivalent wind speed (as defined in the *Planning Code*) more than one hour of any year must be modified to meet this criterion. (The 26 mph standard accounts for short-term—3-minute averaged—wind observations at 36 mph as equivalent to the frequency of an hourly averaged wind of 26 mph. As noted above, winds over 34 mph make it difficult for a person to maintain balance, and gusts can blow a person over.) The San Francisco Planning Department generally refers to the wind hazard criterion to determine the significance for CEQA purposes evaluate wind effects of new development in all areas of the City.

III.G.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to wind, but generally consider that implementation of the Project would have significant impacts if it were to:

G.a Alter wind in a manner that substantially affects public areas

To assess whether a project would result in a significant impact under this criterion, the City and Agency uses the Planning Code's hazard standard, that is, it determines whether a project would cause equivalent wind speeds to reach or exceed the hazard level of 26 mph for a single hour of the year. If a project would cause such an exceedance, the City and Agency requires a mitigation measure requiring that the project buildings be designed to avoid an exceedance.

Analytic Method

Ground-level wind accelerations near buildings are controlled by exposure, massing, and orientation. The Project's potential for accelerated winds was evaluated based on a review of proposed street layout, building

heights, and building orientations to identify locations where exposure, massing or orientation to the prevailing winds would suggest that increased winds could affect pedestrian spaces.

Tall, slab-like buildings tend to deflect wind downward. As wind flow comes over the edge of a roof or around a corner, it separates into streams at about three-quarters of the building height.[154] Above this, the air flows up the face of the building and over the roof; below, it flows down to form a vortex in front of the building before rushing around the windward corners.[155] The resulting increased wind speeds and turbulence at ground level can represent a hazard to pedestrians. This phenomenon is greatest with a single tall building in an open area with no surrounding structures, and can vary substantially by building orientation, massing, and adjacency of other structures. A building that is surrounded by taller structures is not likely to cause adverse wind accelerations at ground level, while even a comparatively small building 100 feet tall could cause wind effects if it were freestanding and exposed.[156]

Massing is important in determining wind impacts because it controls how much wind is intercepted by the structure and whether building-generated wind accelerations occur above ground or at ground level. In general, slab-shaped buildings have the greatest potential for wind acceleration effects. Buildings that have an unusual shape, rounded faces, or utilize set-backs have a less noticeable wind effect. A general rule is that the more complex the building is geometrically, the less noticeable the probable wind impact at ground level.

Building orientation also affects how much wind is intercepted by the structure, a factor that directly determines wind acceleration. In general, buildings that are oriented with the wide axis across the prevailing wind direction will have a greater impact on ground-level winds than a building oriented with the long axis along the prevailing wind direction.

Typically, for new buildings that would be taller than 80 feet to 100 feet, compliance with the wind thresholds can be determined through wind-tunnel testing of a scale model of a Project building and its surroundings. Project tower designs are preliminary, and wind-tunnel testing, if any, will occur prior to design approval of buildings over 100 feet. Accordingly, this EIR analysis qualitatively evaluates the Project's potential to create hazardous wind conditions at pedestrian level.

The wind assessment prepared for the Project evaluated the proposed street alignments, overall massing of structures and location of taller buildings to identify potential wind problems, and suggested means of mitigating adverse wind impacts.[157,158]

Additionally, the Project's potential contribution to cumulative wind impacts are evaluated in the context of existing, proposed, and reasonably foreseeable future development expected in the Project vicinity.

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[154] The exact location of this region of wind divergence depends on the effects of adjacent structures as well as the orientation of the building to the predominant wind direction; this is given as an example of potential wind action only.
[155] http://www.buildinggreen.com/auth/article.cfm?fileName=180501a.xml (accessed August 29, 2009).
[156] CPP, Inc., *June, 2007*.
[157] CPP, Inc., *June, 2007*.
[158] CPP, Inc., *Preliminary Pedestrian Wind Assessment: Response to Comments Candlestick Point and Hunters Point Development, CPP Project 4139, Addendum 1*, March 10, 2008.

Construction Impacts

The potential construction impacts due to wind have been analyzed in other sections of this EIR, where appropriate. For example, Section III.H (Air Quality) analyzes fugitive dust air emissions, and Section III.M (Hydrology and Water Quality) analyzes erosion from Project construction that could cause fugitive dust emissions.

Operational Impacts

Impact W-1: Wind Hazard Criterion

Impact of Candlestick Point

Impact W-1a **Implementation the Project at Candlestick Point would not include tall structures that would result in ground-level-equivalent wind speed exceeding 26 mph for a single hour of the year in pedestrian corridors and public spaces. (Less than Significant with Mitigation) *[Criterion G.a]***

As explained above, building structures near or greater than 100 feet in height could create pedestrian-level conditions such that the wind hazard criterion of 26-mph-equivalent wind speed for a single hour of the year would be exceeded. There is no threshold height that triggers the need for wind-tunnel testing to determine whether the building design would result in street-level winds that exceed the standard. It is generally understood, however, from many prior wind-tunnel tests on a variety of projects in San Francisco that most, if not all, buildings under 100 feet do not result in adverse wind effects at street level, barring unusual circumstances.

The proposed building heights in the Candlestick Point development would range from 65 feet in the northwest and western portions of the Candlestick Point site, and 85 feet to 140 feet further east. The Project would also include up to 11 residential towers ranging from 170 feet to 420 feet in height (refer to Figure II-5 [Proposed Maximum Building Heights]). Based on the site map, due to the orientation of the street grid, buildings in the 65- to 85-foot height areas would not be substantially exposed to predominant west and northwest winds, nor would buildings in that height range create substantial wind funneling effects.[159]

Project structures approaching or over 100 feet would be located toward the interior of the development to maximize compatibility with existing adjacent neighborhoods. The CP North district would contain up to five residential towers with heights from 170 feet to 270 feet. The CP South district would include six residential towers, consisting of two residential towers on the south half of the district with a maximum heights of up to 370 feet (approximately 40 stories) and one tower on the south end of the district with a maximum height of 420 feet (approximately 42 stories). The north half of the district would have three residential towers, one with maximum height up to 270 feet and two with maximum heights up to 320 feet.

The site design ensures that the towers on the Project site are not clustered, which would mitigate a number of wind effects.[160] In addition, the Project street pattern would have most streets oriented northwest/southeast and northeast/southwest, rather than north/south and east/west. That street pattern

[159] Donald J. Ballanti, Certified Consulting Meteorologist, personal communication, August 31, 2009.
[160] CPP, Inc., *June, 2007*.

would not be directly exposed to prevalent westerly wind directions. The northwest–oriented streets would be exposed to northwesterly winds, but the streets would alignment would encourage the wind to flow over the top of the buildings, reducing wind speed at street level.[161] In the retail areas, Project features such as awnings, locating outdoor eating areas away from main crossroads areas, street plantings, articulated building façades, and screenings would reduce the effect of these winds at street level.[162]

Since the Project street grid would not align directly with predominant west and west-northwest wind directions, it would, not result in channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potentially significant pedestrian-level wind acceleration. However, project structures between 100 feet and 420 feet in height would extend well above surrounding buildings and would intercept a large volume of wind. Because of that exposure, the tower structures would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open space. Project towers could affect pedestrian-level wind conditions in proposed parks—Candlestick Point Neighborhood Park; Bayview Gardens/Wedge Park; and Mini Wedge-Park—and in CPSRA areas near the towers (refer to Figure II-9 [Proposed Parks and Open Space] for Project open space areas.) Project plans have identified locations of towers, but tower designs are preliminary. The extent of changes in pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas.

As described below in MM W-1a, the design review process would include a preliminary evaluation by Agency staff to determine whether further specific study would be required. To ensure that this potential impact is reduced to a less-than-significant level, the following mitigation measure shall be implemented:

- *MM W-1a* <u>*Building Design Wind Analysis.*</u> *Prior to design approval of Project buildings, for high-rise structures above 100 feet, the Applicant shall retain a qualified wind consultant to provide a wind review to determine if the exposure, massing, and orientation of the building would result in wind impacts that could exceed the threshold of 26-mph-equivalent wind speed for a single hour during the year. The wind analysis shall be conducted to assess wind conditions for the proposed building(s) in conjunction with the anticipated pattern of development on surrounding blocks to determine if the Project building(s) would cause an exceedance of the wind hazard standard. The analysis shall be conducted as directed by the City's wind study guidelines, including, if required, wind tunnel modeling of potential adverse effects relating to hazardous wind conditions. The Agency shall require the Applicant to identify design changes that would mitigate the adverse wind conditions to below the threshold of 26-mph-equivalent wind speed for a single hour of the year. These design changes could include, but are not limited to, wind-mitigating features, such as placing towers on podiums with a minimum 15-foot setback from street edges, placement of awnings on building frontages, street and frontage plantings, articulation of building facades, or the use of a variety of architectural materials.*

Implementation of appropriate design changes required by mitigation measure MM W-1a would reduce hazardous wind effects at pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas. These design changes would reduce the wind hazard to below the established threshold and would ensure safety in pedestrian-access areas. With implementation of mitigation measure MM W-1a, the potential impact would be reduced to a less-than-significant level.

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[161] CPP, Inc., *June, 2007.*
[162] CPP, Inc., *June, 2007.*

Impact of Hunters Point Shipyard Phase II

Impact W-1b **Implementation of the Project at HPS Phase II would not include tall structures that would result in ground-level-equivalent wind speed exceeding 26 mph for a single hour of the year in pedestrian corridors and public spaces. (Less than Significant with Mitigation) *[Criterion G.a]***

As discussed above, building structures near or greater than 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26-mph-equivalent wind speed for a single hour of the year would be exceeded. There is no threshold height that triggers the need for wind-tunnel testing to determine whether the building design would result in street-level winds that exceed the standard. It is generally understood, however, from years of wind-tunnel testing on a variety of projects in San Francisco, that most, if not all, buildings under 100 feet do not result in adverse wind effects at street level barring unusual circumstances.

The proposed building heights for HPS Phase II would be 65 feet in most portions of the HPS Phase II site, with 85- to 105-foot limits farther east. HPS Phase II would include up to two residential towers ranging from 270 to 370 feet (refer to Figure II-5 [Proposed Maximum Building Heights]). The new 49ers Stadium would be approximately 156 feet to the top row of seating. Buildings in 65- to 85-foot height limit areas would not be substantially exposed to predominant west and northwest winds or wind funneling effects due to the orientation of the street grid, and would not have a significant impact on pedestrian-level wind conditions.

One residential tower with a maximum height up to 370 feet (approximately 40 stories) would be at the southeast corner of the HPS Phase II North district, adjacent to the Village Center, and a second tower, up to 270 feet would be located in the Research and Development district. Structures in the center of the Research and Development district in HPS Phase II would range from 85 to 105 feet tall. With regard to the new stadium, the top row of stadium seating would be at an elevation of approximately 156 feet (about 15 stories) above the playing field. These structures could cause acceleration of winds in nearby pedestrian sidewalk areas or public open space. Project plans have identified the locations of towers, but tower designs are preliminary. The degree of changes in pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas.

The Project street pattern would have most streets oriented northwest/southeast and northeast/southwest, rather than north/south and east/west. That street pattern would not be directly exposed to prevalent westerly wind directions. The streets in each of the sections are aligned in a manner to encourage the wind to flow over the top of the buildings, reducing wind speed at street level. In the retail areas, Project features such as awnings, locating outdoor eating areas away from main crossroads areas, street plantings, and screenings would reduce the potential adverse effects of these winds at street level.

As with development at Candlestick Point, the HPS Phase II street grid would not align with predominant west and west-northwest wind directions and would reduce the channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potential pedestrian-level wind acceleration.

Implementation of mitigation measure MM W-1a and the appropriate design changes it requires would reduce hazardous wind effects at pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas. These design changes would reduce the wind hazard to below the established threshold, and would ensure safety in pedestrian-access areas. With implementation of mitigation measure MM W-1a, the potential impact would be reduced to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact W-1 **Implementation of the Project would not include tall structures that would result in ground-level-equivalent wind speed exceeding 26 mph for a single hour of the year in pedestrian corridors and public spaces. (Less than Significant with Mitigation) *[Criterion G.a]***

Please refer to the discussion for Impact W-1a and Impact W-1b, above. Structures above 100 feet in height and ranging up to 420 feet would extend well above surrounding buildings and would intercept a large volume of wind. Because of that exposure, the tower structures would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open space. The degree of changes in pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. Structures nearing or over 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 mph for a single hour of the year would be exceeded. This is a potentially significant impact.

As discussed above, the Project street grid would not align with predominant west and west-northwest wind directions and would, therefore, not result in channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potentially significant pedestrian-level wind acceleration. The Project street grid would not align with predominant west and west-northwest wind directions and would reduce the channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potential pedestrian-level wind acceleration.

Implementation of mitigation measure MM W-1a would reduce the potential wind impact by requiring review by a qualified wind consultant for all buildings determined by Agency staff as potentially problematic with respect to wind and, where necessary, design changes to reduce any impact below the established threshold. Implementation of required design changes, if any, would reduce potential hazardous wind effects at pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas and would ensure pedestrian safety in pedestrian-access areas. With implementation of mitigation measure MM W-1a, the potential impact would be less than significant.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts with regard to wind effects is limited to the immediate Project area. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development includes the Project site, the Executive Park site (located immediately west of Candlestick Point), Bayview Hill, and all of Hunters Point. None of the related projects located in these

areas include structures with heights greater than 100 feet, except for Executive Park, where demolition of 3 existing buildings and construction of 13 new buildings (with roof heights ranging from approximately 86 to 293 feet) is proposed.[163] As that development includes structures with heights greater than 100 feet, towers at the Executive Park site would intercept a large volume of wind which could have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open spaces.

As noted above, the dominant wind direction in the project vicinity is west-northwest, and winds from the west, northwest, and west-northwest account for roughly half of the local wind patterns.[164] As the Executive Park site is directly west of the Candlestick Point, west-northwest and northwest winds would not have the potential to contribute to cumulative wind conditions within the Project site. However, west winds, which occur approximately 13 percent of the time,[165] could have the potential to contribute to cumulative wind conditions within the Project site. As discussed in Section III.P (Recreation), a cumulative wind analysis provided in a Technical Memorandum prepared for the Executive Park development concluded that cumulative development generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed.[166]

In addition, the distance between the Executive Park development (located at 150 and 250 Executive Park Boulevard and 5 Thomas Mellon Circle[167]), is approximately 1,000 feet west of the western border of the Candlestick Point Center and Candlestick Point districts, and approximately 1,500 feet would separate the eastern edge of the Executive Park development and closest residential tower within the Project site (a 360-foot residential tower located at Candlestick Point South). Given the presence of intervening structures between these two locations (The Cove residential development) and the orientation of the street grid pattern in Candlestick Point South, and the likely presence of street trees in all of these areas, winds generated by towers within the Executive Park development would not be funneled by development along the streets in the Project site, and the Project's contribution to cumulative wind impacts would not be considerable. Cumulative impacts would be less than significant.

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163 Environmental Science Associates, *Potential Wind Conditions at Executive Park Development,* May 4, 2009.
164 CPP, Inc., *June, 2007.*
165 CPP, Inc., *June, 2007.*
166 Environmental Science Associates, May 4, 2009.
167 San Francisco Planning Department, *Notification of Preparation of an Environmental Impact Report and Public Scoping Meeting, Case No. 2006.0422 E - Executive Park Subarea Plan Amendments to the General Plan, Planning Code, and Zoning Map; Yerby Company Development; Universal Paragon Corporation Development*, October 27, 2006.

SECTION III.H AIR QUALITY

III.H.1 Introduction

This section of the EIR evaluates the potential impacts on air quality resulting from implementation of the Project. This includes the potential for the Project to conflict with or obstruct implementation of the applicable air quality plan, to violate an air quality standard or contribute substantially to an existing or projected air quality violation, to result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in nonattainment, expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors that would affect a substantial number of people. This section identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts.

The analyses includes an (1) evaluation of criteria air pollutant mass emissions including emissions by construction workers and equipment (refer to Appendix H2 [Construction Workers and Equipment]) using methodology provided in Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines; (2) operational emissions from project-related and mobile sources; and (3) ambient carbon monoxide concentration from mobile sources (refer to Appendix H1 [Air Quality Model Input/Output]).[168,169] In addition, this section provides a summary of the human health risk assessments (HRAs) conducted for (1) diesel particulate matter (DPM) emissions; (2) potentially contaminated dust emissions; (3) fine particulate matter ($PM_{2.5}$) emissions; and (4) potential emissions of toxic air contaminants (TAC) from stationary sources at proposed Research and Development (R&D) uses at the Project. Those four topics are based on a report prepared by ENVIRON International Corporation (ENVIRON) entitled *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan* (refer to Appendix H3 [Ambient Air Quality and Human Health Risk Assessment]).

Section III.S (Greenhouse Gas Emissions) evaluates Project greenhouse gas (GHG) emissions and their potential contribution to climate change.

III.H.2 Setting

Environmental Background

The Project is located in the City and County of San Francisco, which is within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB also comprises all of Alameda, Contra Costa, Marin, Napa, San Mateo, and Santa Clara Counties, the southern half of Sonoma County, and the southwestern portion of Solano County.

Ambient air quality is influenced by climatological conditions, topography, and the quantity and type of pollutants released in an area. The major determinants of transport and dilution of a given pollutant are wind, atmospheric stability, terrain; sunshine can impact the concentrations of photochemical pollutants.

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[168] Bay Area Air Quality Management District (BAAQMD). 1999. BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans. December.

[169] BAAQMD. 2009. California Environmental Quality Act, Draft Air Quality Guidelines. September & November Drafts.

Climate, Topology, and Meteorology

The regional climate in the SFBAAB is considered semi-arid and is characterized by mild, dry summers and mild, moderately wet winters (about 90 percent of the annual total rainfall is received in the November-April period), moderate daytime onshore breezes, and moderate humidity. The climate is dominated by a strong, semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the moderating effects of the adjacent oceanic heat reservoir. In summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning, and temperatures are mild. In winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur.

The Project is located in the San Francisco Peninsula (Peninsula) climatological subregion that extends northwest from San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the Peninsula, creating an area of warmer temperatures and fewer foggy days to the east where the ridgeline blocks the marine layer. In San Francisco, the mean maximum summer temperatures are in the mid-60s degrees Fahrenheit, while mean minimum temperatures during the winter months are in the high-30s to low-40s degrees Fahrenheit. Annual average wind speeds range from 4 to 9 knots throughout the Peninsula with prevailing winds from the west, although local wind patterns are often influenced greatly by local topographic features.

In summer, the northwest winds to the west of the Pacific coastline are drawn into the interior through the Golden Gate and over the lower portions of the San Francisco Peninsula. This channeling of the flow through the Golden Gate produces a jet that sweeps eastward but widens downstream producing southwest winds at Berkeley and northwest winds at San Jose. Wind speeds may be locally strong in regions where air is channeled through a narrow opening such as the Golden Gate or San Bruno Gap. For example, the average wind speed at San Francisco International Airport from 3:00 P.M. to 4:00 P.M. in July is about 17 knots, compared with only about 9 knots at San Jose and less than 6 knots at the Farallon Islands.

The sea breeze between the coast and the Central Valley commences near the surface along the coast in late morning or early afternoon; it may be first observed only through the Golden Gate. Later in the day the layer deepens and intensifies while spreading inland. As the breeze intensifies and deepens it flows over the lower hills farther south along the Peninsula. This process frequently can be observed as a bank of stratus "rolling over" the coastal hills on the west side of the Bay. The depth of the sea breeze depends in large part upon the height and strength of the inversion. The generally low elevation of this stable layer of air prevents marine air from flowing over the coastal hills. It is unusual for the summer sea breeze to flow over terrain exceeding 2000 feet in elevation.

In winter, the Bay Area experiences periods of storminess and moderate-to-strong winds and periods of stagnation with very light winds. Winter stagnation episodes are characterized by outflow from the Central Valley, nighttime drainage flows in coastal valleys, week onshore flows in the afternoon and otherwise light and variable winds.

Onshore winds from the west dominate at the Project such that emissions from the Project would be blown eastward over the San Francisco Bay.

Existing Air Quality Conditions

In addition to climate, topology, and meteorology, a wide range of emissions sources—such as dense population centers, heavy vehicular traffic, and industry—influences the air quality within the SFBAAB. Air pollutant emissions within the Bay Area are generated by stationary (or point), area wide and mobile sources. Stationary sources exist at identified locations and are usually associated with specific large manufacturing and industrial facilities; examples include fossil-fuel power plants or large boilers that provide industrial process heat. Area wide sources consist of many smaller point sources that are widely distributed spatially; examples include residential and commercial water heaters, painting/coating operations, power lawn mower use, agricultural operations, landfills, and the use of consumer products such as barbeque lighter fluid, hair spray, etc. Mobile sources include on-road motor vehicles and other transportation sources like aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can also be generated by natural sources such as fine dust particles suspended in the air by high winds.

Criteria Pollutants

The federal and state governments have established ambient air quality standards (National Ambient Air Quality Standards [NAAQS] and California Ambient Air Quality Standards [CAAQS]) for outdoor concentrations of a number of pollutants to protect the health and welfare of the people most sensitive to their effects. Such pollutants are called "criteria" pollutants, the most common of which are listed below in Table III.H-1 (State and Federal Criteria Air Pollutant Standards, Effects, and Sources), which includes NAAQS and CAAQS and the known health effect for these pollutants. Table III.H-1 also discloses the health effects of each criteria pollutant, and the federal and state attainment status for each.

- **Ozone** (O_3) is a gas that is not directly emitted into the air but formed when reactive organic gases (ROG) and nitrogen oxides (NO_X)—both byproducts of internal combustion engine exhaust (ROG can also originate from the evaporation of chemical solvents or fuels)—undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are conducive to its formation. Because of the reaction time involved in forming ozone, peak ozone concentrations are often found far downwind of precursor emissions. Therefore, ozone is seen as a regional pollutant where emissions and generation occur over large areas.

  Emissions of the ozone precursors ROG and NO_X from both mobile (vehicle) and stationary sources have decreased in the SFBAAB since 1975 and are projected to continue declining through 2020. Reasons include the implementation of strict motor vehicle emissions controls, new controls on oil refinery fugitive emissions, and new rules for control of ROG from industrial coatings and solvent operations.[170] Concomitantly, the peak 1-hour and 8-hour concentrations have declined by nearly 18% during the last 20 years.[171]

- **Carbon Monoxide** (CO) is a colorless, odorless gas produced by the incomplete combustion of fuels, primarily from transportation sources though also from wood-burning stoves, incinerators and other industrial sources. CO concentrations tend to be the highest during the winter morning, with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines—unlike ozone—and motor vehicles operating at slow speeds are the primary source of CO in the Bay Area, the highest ambient CO concentrations

[170] California Air Resources Board. 2009. The 2009 California Almanac of Emissions and Air Quality. Sacramento, CA.
[171] Ibid.

are generally found near congested transportation corridors and intersections. In contrast to ozone issues, which tend to be regional in nature, CO issues tend to be localized.

- **Nitrogen Dioxide** (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made NO_2 sources are combustion devices, such as boilers or turbines, and internal combustion engines, such as automobile or generator engines. Combustion devices emit primarily nitrogen oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. NO and NO_2 are collectively referred to as NO_X. As NO_2 is formed and depleted by reactions associated with photochemical smog, the NO_2 concentrations in a particular geographical area may not be representative of the local NO_X emissions sources.
- **Sulfur dioxide** (SO_2) is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal, and from chemical processes occurring at chemical plants and refineries.
- **Respirable Particulate Matter** (PM_{10}) and **Fine Particulate Matter** ($PM_{2.5}$) consist of extremely small, suspended particles or droplets 10 microns and 2.5 microns or smaller in diameter, respectively. Some sources of particulate matter, like pollen, forest fires, and windblown dust, are naturally occurring. However, in populated areas, most particulate matter is caused by road dust, combustion products, abrasion of tires and brakes, and construction activities. Particulate matter can also be formed in the atmosphere by condensation of SO_2 and ROG.
- **Lead** (Pb) occurs in the atmosphere as particulate matter. Historically, the combustion of leaded gasoline was the primary source of airborne lead in the Bay Area, though the use of leaded gasoline is no longer permitted for on-road motor vehicle. Other sources of lead include the manufacturing and recycling of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters.
- **Sulfates** (SO_4) are the fully oxidized ionic form of sulfur. Emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.
- **Hydrogen Sulfide** (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation.
- **Vinyl Chloride** (chloroethene) is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents. While the California ambient air quality standard for vinyl chloride is still in existence, since 1990 (when the California Air Resources Board [ARB] identified it as a TAC) the compound is typically evaluated using risk assessment methods.
- **Visibility-Reducing Particles** consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The Statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

Table III.H-1 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

		State Standard[a]		*Federal Standard[b]*			
Pollutant	***Averaging Time***	***Concentration***	***Attainment Status***	***Concentration***	***Attainment Status***	***Pollutant Health and Atmospheric Effects***	***Major Pollutant Sources***
Ozone	1-Hour 8-Hour	0.09 ppm 0.070 ppm	N N	—[c] 0.075 ppm	—[c] N	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when ROG and NO_X react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial industrial mobile equipment.
Carbon Monoxide	1-Hour 8-Hour	20 ppm 9.0 ppm	A A	35 ppm 9 ppm	A A	Classified as a chemical asphyxiate, CO interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1-Hour Annual	0.18 ppm 0.030 ppm	A A	— 0.053 ppm	A A	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 Hour 24-Hour Annual	0.25 ppm 0.04 ppm —	A A	— 0.14 ppm 0.030 ppm	 A A	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Particulate Matter (PM_{10})	24-Hour Annual	50 µg/m^3 20 µg/m^3	N N	150 µg/m^3 —[d]	U	May irritate eyes and respiratory tract, decreases in lung capacity, cancer, and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
Fine Particulate Matter ($PM_{2.5}$)	24-Hour Annual	— 12 µg/m^3	 N	35 µg/m^{3,e} 15 µg/m^3	A A	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning. Also formed from photochemical reactions of other pollutants, including NO_X, $S0_2$, and organics.
Lead	Monthly Quarterly 3-Month Rolling	1.5 µg/m^3 — —	A	— 1.5 µg/m^3 0.15 µg/m^3	 A U	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
Sulfates	24-Hour	25 µg/m^3	A	No Federal Standard		Decrease ventilatory function, aggravate asthmatic symptoms, and increase risk of cardio-pulmonary disease. Degrade visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	U	No Federal Standard		Primarily an odor nuisance at ambient concentrations.	Present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation.

Table III.H-1 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

		State Standard[a]		*Federal Standard*[b]			
Pollutant	***Averaging Time***	***Concentration***	***Attainment Status***	***Concentration***	***Attainment Status***	***Pollutant Health and Atmospheric Effects***	***Major Pollutant Sources***
Vinyl Chloride	24-Hour	0.01 ppm (26 µg/m^3))	U	No Federal Standard		Short-term exposure to high levels causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure through inhalation and oral exposure causes in liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation.	Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more because of particles when the relative humidity is less than 70%.	U	No Federal Standard		Limits visibility.	Combustion processes in motor vehicles, industrial and commercial boilers and incinerators, power generating plants, solid fuel domestic heating, domestic incineration. Natural sources of airborne particles include fine soil particles and smoke particles from bushfires.

SOURCE: BAAQMD's Air Quality Standards and Attainment Status internet site http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, ARB's California Ambient Air Quality Standards (CAAQS) internet site http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm, and the United States Environmental Protection Agency's (USEPA's) National Ambient Air Quality Standards (NAAQS) internet site http://www.epa.gov/air/criteria.html, (accessed October 12, 2009)

A = Attainment; N = Nonattainment; U = Unclassified (insufficient data collected to determine classification; generally indicates low concern for the pollutant levels); ppm = parts per million; µg/m^3 = micrograms per cubic meter

a. California standards for O_3, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO, suspended particulate matter—PM_{10}, and visibility-reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe CO, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-, 8-, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), some measurements may be excluded. In particular, measurements are excluded that California ARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.

b. Federal standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 65 µg/m^3.

c. The federal 1-hour ozone standard was revoked on June 15, 2005.

d. Because of lack of evidence linking health problems to long-term coarse particle exposure, the USEPA revoked the annual PM_{10} standard on September 21, 2006.

e. USEPA lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 in 2006 and issued attainment status designations for the 35 µg/m^3 standard on December 22, 2008. USEPA designated the SFBAAB as nonattainment for the 35 µg/m^3 $PM_{2.5}$ standard; however, that designation has not yet been published in the Federal Register and is, therefore, not yet effective.

Regional Emissions Inventory

With the assistance of the BAAQMD, the California ARB compiles inventories of CO, ROG (reactive organic gases, which are ozone precursors), NO_2, PM_{10}, and $PM_{2.5}$ emissions for the SFBAAB. Table III.H-2 (San Francisco Bay Area Air Basin and San Francisco County Criteria Pollutant Emissions Inventory and Projections, 2008 [Tons/Day—Annual Average]) presents a summary of the most recent year of emissions data for the SFBAAB and San Francisco County.

Table III.H-2 San Francisco Bay Area Air Basin and San Francisco County Criteria Pollutant Emissions Inventory and Projections, 2008 (Tons/Day—Annual Average)

	CO	*ROG*	*NO_X*	*SO_X*	*PM_{10}*	*$PM_{2.5}$*
SFBAAB						
2008 Estimated						
Total Emissions	1,748	378	448	62	212	81
Mobile Source Emissions	1,542	183	381	15	20	16
San Francisco						
2008 Estimated						
Total Emissions	148	34	79	15	17	7.5
Mobile Source Emissions	142	18	74	15	4.6	4.1

SOURCE: California ARB, Almanac Emission Projection Data, http://www.arb.ca.gov/app/emsinv/emssumcat.php (accessed October 2009).

Natural source are excluded from this inventory.

Monitoring Station Data and Attainment Area Designations

The SFBAAB has instances of recorded violations of federal and state AAQS for ozone, CO, and PM_{10} over the last 30 years. Since the early 1970s, substantial progress has been made toward controlling these pollutants. Emissions and ambient concentrations of CO decreased in the SFBAAB with the introduction of the catalytic converter in 1975, and with subsequent improvements in motor vehicle engine technology and the introduction of oxygenated fuel. No violations of the state AAQS or federal AAQS for CO have been recorded in the Bay Area since 1991. The Bay Area is in attainment for all state and federal standards except those for ozone, PM_{10}, and $PM_{2.5}$. For ozone, the SFBAAB does not meet either the state or federal standards. For PM_{10} and $PM_{2.5}$, the SFBAAB does not meet the state standards but does meet the current federal standards.[172]

- The BAAQMD operates many air quality monitoring stations throughout the Bay Area. While the monitoring network is designed to measure air quality on a regional level, the locations of the monitors may not capture variations in air quality conditions on the sub-regional level. The closest monitoring station to the Project operated by the BAAQMD is the San Francisco-Arkansas Street monitoring station, which is located

[172] United States Environmental Protection Agency (USEPA) lowered the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ in 2006 and issued attainment status designations for the 35 $\mu g/m^3$ standard on December 22, 2008. USEPA designated the SFBAAB as nonattainment for the 35 $\mu g/m^3$ $PM_{2.5}$ standard; however, that designation has not yet been published in the Federal Register and is, therefore, not yet effective.

approximately three miles to the north of the Project on Potrero Hill. Table III.H-3 (Summary of Local Ambient Air Quality in the Project Vicinity) shows recent data taken at this monitoring station (i.e., 2006 through 2008).[173] During this period at this station, the state and federal ozone standards were not exceeded. The state 24-hour PM_{10} standard was exceeded five times while the federal 24-hour PM_{10} standard was not exceeded. For this time period, the annual average was above the state standard of 20 $\mu g/m^3$. The federal 24-hour standard for $PM_{2.5}$ standard was exceeded eight times over this period at this station; however, over this period, the annual average was below both the state 12 $\mu g/m^3$ and federal 15 $\mu g/m^3$ standards.

Table III.H-3 Summary of Local Ambient Air Quality in the Project Vicinity

Air Pollutants[a]	*Year* 2006	2007	2008
Ozone			
Maximum 1-hour concentration measured[b]	0.053 ppm	0.060 ppm	0.082 ppm
Days exceeding state 0.09 ppm 1-hour standard	0	0	0
Maximum 8-hour concentration measured[c]	0.046 ppm	0.049 ppm	0.066 ppm
Days exceeding state 0.07 or federal 0.075 ppm 8-hour standard	0	0	0
Respirable Particulate Matter (PM_{10})			
Annual average concentration measured[a]	22.9 $\mu g/m^3$	21.9 $\mu g/m^3$	22.0 $\mu g/m^3$
Maximum 24-hour concentration measured[d]	61.4 $\mu g/m^3$	69.8 $\mu g/m^3$	41.3 $\mu g/m^3$
Days exceeding federal 150 $\mu g/m^3$ 24-hour standard	0	0	0
Days exceeding state 50 $\mu g/m^3$ 24-hour standard	3	2	0
Fine Particulate Matter ($PM_{2.5}$)			
Annual average concentration measured[a]	9.7 $\mu g/m^3$	8.7 $\mu g/m^3$	9.8 $\mu g/m^3$
Maximum 24-hour concentration measured	54.3 $\mu g/m^3$	45.2 $\mu g/m^3$	29.4 $\mu g/m^3$
No. of days exceeding federal 35 $\mu g/m^3$ 24-hour standard[e]	3	5	N/A[f]
Carbon Monoxide (CO)			
Maximum 8-hour concentration measured	2.09 ppm	1.60 ppm	2.3 ppm
Number of days exceeding federal and state 9.0 ppm 8-hour standard	0	0	0
Nitrogen Dioxide (NO_2)			
Annual average concentration measured[a]	0.016 ppm	0.016 ppm	0.016 ppm
Maximum 1-hour concentration measured	0.11 ppm	0.069 ppm	0.062 ppm
Days exceeding state 0.18 ppm 1-hour standard	0	0	0

SOURCE: BAAQMD *Annual Bay Area Air Quality Summaries*, 2006 through 2008, (http://www.baaqmd.gov/~/~/link.aspx?_id=7BE01D796A3644E2B0BC30BDD4665912&_z=z, Accessed October 2009)

a. Data is taken from the BAAQMD San Francisco-Arkansas Street monitoring station.
b. ppm = parts by volume per million of air.
c. The California 8-hour ozone standard was implemented on May 17, 2005.
d. $\mu g/m^3$ = micrograms per cubic meter.
e. On December 17, 2006, the USEPA implemented a more stringent federal 24-hour $PM_{2.5}$ standard revising it from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. $PM_{2.5}$ exceedance days for 2006 to 2008 reflect the new 35 $\mu g/m^3$ standard.
f. Insufficient data available per California ARB.

[173] BAAQMD formerly maintained a Bayview monitoring station, but monitoring activities ceased in 2005.

The Bayview Community Air Monitoring Project (BayCAMP) was a joint project conducted by the San Francisco Department of the Environment, the California ARB, and the BAAQMD to measure air pollutants (i.e., criteria pollutants and air toxics) for a one-year period in the Bayview Hunters Point community and compare them to measurements collected at Arkansas Street in San Francisco and the Cities of San Jose and Fremont.[174] Measurements were collected from mid-2004 to mid-2005 from a monitoring station located at the Earl P. Mills Community Center on Whitney Young Circle. Criteria pollutants measured in the Bayview-Hunters Point neighborhood were below federal and state standards and similar to or less than those collected in at other locations, with the exception of $PM_{2.5}$ and ozone. Peak ozone concentration (0.096 ppm) in the Bayview-Hunters Point neighborhood were slightly above state standards but were comparable to the other sites. The maximum 24-hour average $PM_{2.5}$ concentration (~50 $\mu g/m^3$) was comparable to the other sites, but exceeded the federal standard. Conversely, the annual average $PM_{2.5}$ (10.3 $\mu g/m^3$) concentration was well below the federal and state standards and was much lower than the concentrations reported for the other sites.

In 2005 and 2006, air quality monitoring associated with the San Francisco Electric Reliability Project[175] was conducted to compare the BAAQMD air quality monitoring data, as noted above, to several community stations located in the Potrero Hill and Bayview Hunters Point neighborhoods. This study involved measuring annual average concentrations of PM_{10} and $PM_{2.5}$ at five locations including Arkansas Street, the Southeast Community Center, the Muni Maintenance Yard, Potrero Recreation Center, and Malcolm X Academy. The measured annual average PM_{10} concentrations at these five locations ranged from 16.9 to 20 $\mu g/m^3$, with the minimum and maximum measurements reported at the Potrero Recreation Center and Muni Maintenance Yard, respectively. The measured annual average $PM_{2.5}$ concentrations ranged from 7.6 to 9.3 $\mu g/m^3$, with the minimum and maximum measurements reported at the Potrero Recreation Center and Southeast Community Center, respectively.

Toxic Air Contaminants and $PM_{2.5}$

TACs are a regulatory designation that includes a diverse group of air pollutants that can adversely affect human health. They are not fundamentally different from the criteria pollutants, but they have not had ambient air quality standards established for them for a variety of reasons (e.g., insufficient dose-response data, association with particular workplace exposures rather than general environmental exposure, etc.). The health effects of TACs can result from either acute or chronic exposure; many types of cancer are associated with chronic TAC exposures, but TAC exposures can also cause other adverse health effects. Consequently, the BAAQMD has established both a cancer and a non-cancer health risk threshold for TAC emissions.

Significant sources of TACs in the environment include industrial processes, such as petroleum refining, chemical manufacturing, electric utilities, metal mining/refining and chrome plating; commercial operations, such as gasoline stations, dry cleaners and buildings with boilers and/or emergency generators; and transportation activities, particularly diesel-powered vehicles, including trains, buses, and trucks. The California ARB has determined that the 10 compounds which pose the greatest known health risk in

[174] Sierra Research, Inc., *State of the Air in Bayview/Hunters Point, Results of the Bayview Community Air Motoring Project (BayCAMP)*, November 2006.
[175] Rajiv Bhatia and Thomas Rivard, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, 2008.

California, based primarily on ambient air quality data, are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and DPM.[176]

Diesel Particulate Matter

DPM is generated when an engine burns diesel fuel and consists of a mixture of gases and fine particles (also known as soot) that can penetrate deeply into the lungs, where they can contribute to a range of health problems. In 1998, the California ARB identified particulate matter from diesel-powered engines as a TAC based on its potential to cause cancer and other adverse health effects.[177] Diesel exhaust is a complex mixture that includes hundreds of individual constituents and as a mixture, is identified by the State of California as a known carcinogen.[178] However, under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole.[179]

Based on receptor modeling techniques, the California ARB estimated the background DPM health risk in the SFBAAB in 2000 to be approximately 500 cancer cases per million people, which reflects a drop of approximately 36 percent from estimates for 1990.[180]

- ***Fine Particulate Matter ($PM_{2.5}$)***

Though $PM_{2.5}$ is a criteria pollutant, as discussed above, its human health impacts are also of concern as these particles can deposit deep in the lungs and can contain substances that are particularly harmful to human health. Extended exposure to particulate matter can reduce lung function, aggravate respiratory and cardiovascular disease, increase mortality rate and reduce lung function growth in children. Motor vehicles are currently responsible for about half of the particulates in the SFBAAB and wood burning in fireplaces and stoves is another large source.[181] Many scientific studies link fine particulate matter and traffic-related air pollution to respiratory illness. California ARB has established that $PM_{2.5}$ is associated with dose-dependent adverse health effects below existing federal and state air quality standards and in a 2008 study that a 10 percent increase in $PM_{2.5}$ concentrations increased the non-injury mortality by 10 percent.[182]

Naturally Occurring Asbestos

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Naturally occurring asbestos (NOA), which the California ARB identified as a TAC in 1986, is found in many parts of California and commonly associated with serpentine rock (serpentinite).

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[176] California ARB. 2009. The 2009 California Almanac of Emissions and Air Quality. Sacramento, CA.
[177] California ARB, Initial Statement of Reasons for Rulemaking. Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant. June.1998.
[178] California Environmental Protection Agency (Cal/EPA). Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting. Office of Environmental Health Hazard Assessment. 1998.
[179] Ibid.
[180] California ARB. 2009. The 2009 California Almanac of Emissions and Air Quality. Sacramento, CA.
[181] BAAQMD, *Draft California Environmental Quality Act, Air Quality Guidelines*. December 2009.
[182] BAAQMD, *California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance*, December 7, 2009.

As described in Section III.K (Hazards and Hazardous Materials) and Section III.L (Geology and Soils) Franciscan serpentinite and mélange (a mixed assemblage of rock types including serpentinite, shale, chert, sandstone, and greenstone) form most of the bedrock underlying the project area. Both rock types are known to contain small amounts of chrysotile asbestos. Serpentinite has been mapped in Parcels A, B, C, and G of HPS Phase II and may underlie portions of the proposed roadway. Mélange occurs throughout the Hunters Point shear zone, which underlies parts of all the HPS Phase II parcels, but has not been mapped separately. Chrysotile is a NOA mineral that can be a human health hazard if it becomes airborne. The other serpentine minerals found in serpentinite do not form fibrous crystals and are not asbestos minerals.

Exposure to airborne asbestos poses a potential health hazard. The issues related to NOA and naturally occurring metals-containing materials at the Project are addressed in Section III.K (Hazards and Hazardous Materials).

TACs Associated with Contaminated Dust

Historic operations by the US Department of the Navy (Navy) and its tenants at the HPS Phase II area resulted in a number of hazardous materials release sites and associated areas with contaminated soils. The types, levels, and extent of contamination of soils and other environmental media have been identified for the HPS Phase II area through a series of comprehensive environmental investigations conducted at the direction of the Navy. The Navy is currently remediating the contaminated soils under the oversight of federal and state regulatory agencies. Although there are no known hazardous materials release sites at Candlestick Point (CP), soil investigations were conducted at this area in the late 1990s at the direction of DeBartolo Entertainment, Inc. These investigations revealed limited areas with elevated concentrations of metals and/or organic chemicals.

As some of the required remedial actions at HPS may be conducted after the Navy transfers the property, there is a potential for Project-related construction activities to generate dust which have particulate bound chemicals which could impact human health in the surrounding community. As discussed later in this section, ENVIRON evaluated this potential exposure in a human health risk assessment.

Monitoring Station Data for TACs

The BAAQMD measures ambient levels of TACs at a number of monitoring stations in the region. Table III.H-4 (Ambient Concentrations of Carcinogenic TACs in the Bay Area Basin) summarizes district-wide monitored concentrations of carcinogenic TACs for the SFBAAB in 2003, the most recent year for which data are available. Sources include industry, business, agriculture, vehicles, household products, wood stoves, barbecues, and more. Whether air toxics have a harmful effect on an individual's health depends upon a number of factors, including the concentration of toxics in the air and the length of exposure.

Table III.H-4 Ambient Concentrations of Carcinogenic TACs in the Bay Area Air Basin

Compound	Concentration[a] (ppb)	Concentration[a] (µg/m³)	Unit Risk (per µg/m³)	Cancer Risk[b] (Chances in one million)
1,3-Butadiene	0.09	0.21	1.7×10^{-4}	36.0
Benzene	0.40	1.30	2.9×10^{-5}	37.7
Carbon tetrachloride	0.11	0.70	4.2×10^{-5}	29.1
Formaldehyde	2.18	2.72	6.0×10^{-6}	16.3
Acetaldehyde	0.72	1.32	2.7×10^{-6}	3.6
Perchloroethylene	0.03	0.18	5.9×10^{-6}	1.1
Methylene chloride	0.36	1.27	1.0×10^{-6}	1.3
Methyl tert-butyl ether (MTBE)	0.53	1.95	2.6×10^{-7}	0.5
Chloroform	0.02	0.12	5.3×10^{-6}	0.6
Trichloroethylene	0.02	0.12	2.0×10^{-6}	0.2
Particulate TACs				
Chromium (hexavalent)	0.10	1.00×10^{-4}	1.5×10^{-1}	14.4
Dioxin	0.000025	2.50×10^{-8}	38	1.0
Nickel	3.30	3.30×10^{-3}	2.6×10^{-4}	0.8
Polycyclic aromatic hydrocarbons (PAHs)	0.47	4.70×10^{-4}	1.1×10^{-3}	0.5
Lead	7.80	7.8×10^{-3}	1.2×10^{-5}	0.1
Total for all TACs (excluding DPM)				***143***

SOURCE: BAAQMD, *Toxic Air Contaminants 2003 Annual Report*, August 2007.

ppb = parts per billion; µg/m³ = micrograms per cubic meter.

a. The concentration used in the risk calculation is the mean of all daily samples taken for the BAAQMD monitoring network in 2003; however, for some compounds the concentration represents data collected at a subset of the stations in the network. See the BAAQMD Toxic Air Contaminants 2003 Annual Report (issued August 2007) for more details.

b. Cancer risks are calculated for the inhalation pathway using the Unit Risk Factors adopted by OEHHA for the Air Toxics Hot Spots Program, and assuming 70-year continuous exposure. While this risk estimate is representative of the average measured concentrations in urban areas of the Air District, this value does not reflect the potential spatial variation of TAC emissions and/or exposure. Localized TAC "hot spots" can occur.

Cancer risks were also estimated in the Bayview Hunters Point neighborhood as part of the monitoring efforts in the BayCAMP project (Sierra Research, Inc. 2006). The reported cancer risks from TACs based on the monitoring results were estimated to be 219 in one million. However, the authors of the report noted that "more than half of the measured risk (113 in a million out of 219 in a million) is due to acrylonitrile.[183] However, this estimate is probably not very accurate because most of the measurements were below the limit of detection." This means that the risk estimates were calculated using the high detection limit, not measured concentrations. As explained by the authors, "most of the estimated risk comes from this assumed (not measured) concentration." Thus, "the estimated risk would be 106 in a million from the remaining compounds," which is lower than the cancer risk estimates reported for the Bay Area Basin in Table III.H-4.

[183] "Acrylonitrile is primarily used in the manufacture of acrylic and modacrylic fibers, which may be used in products such as apparel and carpets. Acrylonitrile may be released to the ambient air during its manufacture and use." The source of acrylonitrile detected is not known as there are no permitted sources. http://www.epa.gov/ttn/atw/hlthef/acryloni.html.

The BAAQMD reports that combining the California ARB estimates of the population-weighted average ambient air concentration of DPM in the SFBAAB for 2003 with the cancer potency factor adopted by California Environmental Protection Agency's (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) results in an approximate cancer risk associated with exposure to DPM of about 500 to 700 in one million excess cancer risks.[184] Most of the DPM risks are from exposure to exhaust from diesel trucks where the emission sources are relatively close to receptors at businesses and residences near freeways.

Odors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to specific odors. In addition, people may have different reactions to the same odor; an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. An unfamiliar odor is more easily detected and more likely to cause complaints than a familiar one because of the phenomenon known as "odor fatigue," in which a person can become desensitized to almost any odor so that recognition occurs only with an alteration in the intensity.

Quality and intensity are two properties of any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as "flowery" or "sweet," the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases, and the odor intensity weakens and eventually becomes so low that detection or recognition is difficult. At some point during dilution, the concentration of the odorant falls below a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

III.H.3 Regulatory Framework

Air quality within the Bay Area is maintained and improved through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of other programs.

Federal

At the federal level, the United States Environmental Protection Agency (USEPA) is responsible for implementing national air quality programs. The USEPA enforces the federal *Clean Air Act* (federal CAA) and associated NAAQS. As shown in Table III.H-1, the USEPA has established NAAQS for the following

[184] BAAQMD, Toxic Air Contaminants 2003 Annual Report, August 2007.

criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The standards are established to protect the public health and welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal CAA Amendments of 1990 (CAAA) added requirements for states with non-attainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The USEPA must review all SIPs to determine whether they conform to the mandates of the federal CAA and its amendments and to determine whether implementing the SIPs will achieve air quality goals. If the USEPA determines a SIP to be inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the non-attainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

The Project must comply with all required elements of the federal CAA and regulatory requirements of the USEPA.

State

The California ARB, a part of the Cal/EPA, is responsible for the coordination and administration of both federal and state air pollution control programs within California and for implementing the *California Clean Air Act* (CCAA). The CCAA, which was adopted in 1988, required the California ARB to establish CAAQS (Table III.H-1). The California ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the previously mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of those studies.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing emissions from transportation and areawide emission sources and gives districts the authority to regulate indirect sources of emissions.

Among the California ARB's other responsibilities are overseeing local air district compliance with California and federal laws, approving local air quality plans, submitting SIPs to the USEPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

In 2000, the California ARB began a program of identifying and reducing risks associate with the particulate matter emissions from diesel-fueled vehicles in order to reduce diesel-related health risks. The California ARB plan consists of promulgating new regulatory standards for all new on-road, off-road and stationary diesel-fueled engines and vehicles, new retrofit requirements for existing on-road, off-road and stationary diesel-fueled engines and vehicles and new diesel fuel regulations to reduce the sulfur content of diesel fuel as required by advanced diesel emissions control systems. Under the plan, the overall risk reduction program is expected to result in a 75 percent reduction in diesel particulate emissions by 2010 (compared to 2000 levels) and an 85 percent reduction by 2020.

The *Air Quality and Land Use Handbook: A Community Health Perspective* (2005) provides California ARB recommendations for the siting of new sensitive land uses (i.e., residences, schools, daycare centers, playgrounds, and medical facilities) near recognized major sources of TACs (e.g., freeways, large warehouses/distribution centers, rail yards, etc.), as shown in Table III.H-4a (Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities [from CARB 2005]).

Table III.H-4a Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities (from CARB 2005)

Source Category	*Advisory Recommendations*
Freeways and High-Traffic Roads	■ Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. ■ Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). ■ Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	■ Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. Within 1 mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	■ Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the ARB on the status of pending analyses of health risks.
Refineries	■ Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation. ■ Chrome Platers: Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloroethylene	■ Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with three or more machines, consult with the local air district. ■ Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	■ Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities.

These recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality-of-life issues.

Regional

The BAAQMD is the primary agency responsible for air pollution control in the SFBAAB. To that end, the BAAQMD works directly with the Association of Bay Area Governments (ABAG), the Metropolitan Transportation Commission (MTC), and local governments and cooperates actively with all federal and state government agencies. The BAAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emissions sources, and enforces such measures through educational programs or fines, when necessary.

The BAAQMD is directly responsible for reducing emissions from stationary (area and point) sources and for assuring that state controls on mobile sources are effectively implemented, although BAAQMD has no direct authority to regulate mobile source emissions. It has responded to these requirements by preparing a series of Ozone Attainment Plans and Clean Air Plans that comply with the federal CAA and

the CCAA to accommodate growth, reduce the pollutant levels in the SFBAAB, meet NAAQS and CAAQS, and minimize the fiscal impact that pollution control measures have on the local economy. The Ozone Attainment Plans are prepared for the federal ozone standard, and the Clean Air Plans are prepared for the state ozone standards. The BAAQMD Board of Directors adopted the most recent Ozone Attainment Plan in October 2001 and in April 2004 the USEPA made the final finding that the SFBAAB had attained the 1-hour standard. Since then, the 1-hour ozone standard has been replaced by 8-hour ozone standard and the SFBAAB was designated a marginal non-attainment area. Although certain elements of the 8-hour implementation rule are undergoing legal challenge, it is not currently anticipated that marginal areas will be required to prepare attainment demonstrations for the 8-hour standard.

Nonetheless, the BAAQMD continues to work with the MTC and ABAG to update the Bay Area Ozone Strategy (BAOS). The updated BAOS will describe current conditions, review the SFBAAB's progress in reducing ozone levels to attain state 1-hour and 8-hour ozone standards, and describe how the SFBAAB's proposed control strategy will fulfill the CCAA planning requirements for the state 1-hour ozone standard and mitigation requirements for transport of ozone and ozone precursors to neighboring air basins.

The Board of Directors adopted the current regional Clean Air Plan in December 2000. The Clean Air Plan identifies the control measures that would be implemented through 2006 to reduce major sources of pollutants. Those planning efforts have substantially decreased the population's exposure to unhealthful levels of pollutants, even while substantial population growth has occurred within the SFBAAB. The Clean Air Plan predicts that regional ozone concentrations will decrease by 1.2 percent per year or 9.0 percent over the 12 years after it was adopted. The BAAQMD is in the process of preparing a new Clean Air Plan that will address ozone precursors, particulate matter, air toxics, and green house gases.

In 2003, the Legislature enacted Senate Bill 656 (SB 656) to reduce public exposure to PM_{10} and $PM_{2.5}$. SB 656 required the California ARB, in consultation with local air districts, to develop and adopt, by January 1, 2005, a list of the most readily available, feasible, and cost-effective control measures that could be used by the California ARB and the air districts to reduce PM_{10} and $PM_{2.5}$.

Although the BAAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate the air quality issues associated with plans and new development projects within the SFBAAB. However, the BAAQMD has prepared the BAAQMD CEQA Guidelines (1999) to indirectly address these issues in accordance with the projections and programs of the Ozone Attainment Plan and Clean Air Plan. The BAAQMD CEQA Guidelines assists Lead Agencies, as well as consultants, Project proponents, and other interested parties, in evaluating potential air quality impacts of projects and plans proposed in the SFBAAB. Specifically, the BAAQMD CEQA Guidelines explain the procedures that the BAAQMD recommends be followed during environmental review processes required by CEQA. The BAAQMD CEQA Guidelines provide direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The BAAQMD intends that by providing this guidance, the air quality impacts of plans and development proposals will be analyzed accurately and consistently throughout the SFBAAB, and adverse impacts will be minimized.

- As of the date of this Final EIR, the BAAQMD is in the process of revising their CEQA guidelines and is currently planning for the Board of Directors to consider the draft in June 2010.In December 2009, the BAAQMD released its most recent draft table of Staff-Recommended CEQA Thresholds of Significance

which indicates a number of modifications to existing guidelines, including changes to the maximum daily emissions thresholds for criteria pollutants emissions from operational sources as well as requirements for the quantification of criteria pollutant and TAC emissions from construction activities and comparison to mass emission or risk thresholds, respectively. As these draft guidelines have not been adopted by the BAAQMD's Board of Directors, the Project is not subject to the draft requirements; however, a brief analysis of these proposed guidelines in relation to the Project emissions is included at the end of the impact analysis.

Local

San Francisco General Plan

The goal of the Air Quality Element of the *San Francisco General Plan* is to reduce the level of air pollutants and to protect and improve public health, welfare, and quality of life of the citizens of San Francisco and the residents of the metropolitan region. To do so, the *General Plan* designates policies designed to:

- Adhere to state and federal AAQS and programs, reduce mobile sources of air pollution through implementation of the transportation element of the *General Plan*
- Decrease the air quality impacts of development by coordination of land use and transportation decisions
- Improve air quality by increasing public awareness regarding the negative health effects of pollutants generated by stationary and mobile sources
- Minimize particulate matter emissions from road and construction sites
- Link the positive effects of energy conservation and waste management to emission reductions
- Exercise air quality modeling in building design for sensitive land uses, such as residential developments that are located near the sources of pollution such as freeway and industries

City of San Francisco Health Code

Construction Dust Control

San Francisco Health Code Article 22B, Construction Dust Control, requires, for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters), preparation of a site-specific dust control plan. That plan must include a number of equivalent measures to minimize visible dust. These measures contain all the dust control measures presented in the BAAQMD CEQA Guidelines; however the *San Francisco Health Code* requirements increase the watering frequency as well as adding monitoring, recordkeeping, third-party verification, and community outreach requirements not found in the BAAQMD guidelines.

Air Quality Assessment and Ventilation Requirement for Urban Infill Residential Developments

As explained earlier, exposure to $PM_{2.5}$ can result in adverse health effects. SFDPH has developed a strategy for addressing exposures in the siting of new residential buildings.[185] *San Francisco Health Code* Article 38 requires an air quality assessment to evaluate the concentration of $PM_{2.5}$ from local roadway traffic sources

[185] San Francisco Department of Public Health, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 6, 2008.

that may impact new residential development containing 10 or more dwelling units on a site. If the air quality assessment indicates that the estimated concentration of $PM_{2.5}$ at the site attributable to all roadway vehicle emissions within 500 feet (approximately 150 meters) of the site would be greater than 0.2 $\mu g/m^3$ (micrograms per cubic meter), Section 3807 requires development on the site to be designed or relocated to avoid exposure greater than 0.2 $\mu g/m^3$, or a ventilation system to be installed that would be capable of removing 80 percent of ambient $PM_{2.5}$ from habitable areas of the residential units. An Article 38 analysis done for the Project area identified three locations along Arelious Walker between Harney Way and Carroll Avenue, within 50 to 100 feet from the roadway, where total $PM_{2.5}$ roadway concentrations would be expected to exceed 0.2 $\mu g/m^3$ assuming 2030 traffic conditions.[186] Residential structures planned in these locations will be required to comply with Article 38 provisions, which could include redesign or setback of structures to avoid residential exposure or installation of a ventilation system in new residential units, all of which would reduce exposures below the 0.2 $\mu g/m^3$ level.

III.H.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to air quality, but generally consider that implementation of the Project would have significant impacts if it were to:

- H.a Conflict with or obstruct implementation of the applicable air quality plan
- H.b Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- H.c Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)
- H.d Expose sensitive receptors to substantial pollutant concentrations
- H.e Create objectionable odors affecting a substantial number of people

Criteria Pollutants

Construction

The BAAQMD does not recommend any significance thresholds for the emissions of fugitive dust during construction. Instead, the BAAQMD bases the criteria on a consideration of the control measures to be implemented. If all appropriate emissions control measures recommended by the *BAAQMD CEQA Guidelines* are implemented for a project, construction emissions are not considered significant.[187] The City takes a similar approach. As discussed above, *San Francisco Health Code* Article 22B, Construction Dust Control, also requires preparation of a site-specific dust control plan (with mandatory control measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters).

[186] ENVIRON, *Community Hazards and San Francisco Health Code Article 38 Analyses*, May 2010 (also contained in Appendix H4 of the EIR).
[187] BAAQMD, *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, December 1999.

Operation

The BAAQMD recommends that projects with operational emissions that exceed any of the following mass criteria pollutant thresholds be considered significant. These thresholds apply to the operational emissions associated with individual projects only; they do not apply to construction-related emissions. The operational emissions that are generated by individual projects and exceed these thresholds are also considered to be a cumulatively considerable contribution to cumulative air quality by the BAAQMD:

- 80 pounds per day (ppd) or 15 tons per year (tpy) of ROG
- 80 ppd or 15 tpy of NO_X
- 80 ppd or 15 tpy of PM_{10}

Carbon Monoxide

Operational emissions of CO are considered significant if they cause or contribute to violations of the federal or state ambient air quality standards for CO (i.e., 35 ppm and 20 ppm, respectively, for one-hour averages; 9 ppm for eight-hour averages).

Toxic Air Contaminants

Construction

Though not explicitly required by BAAQMD CEQA Guidelines,[188], a HRA was conducted to evaluate the human health effects from emissions of DPM and TAC-containing soil-PM_{10} associated with Project construction activities. This analysis was deemed appropriate due to the scale (multi-year time horizon utilizing extensive construction equipment over a large area) and location (e.g., brownfield redevelopment on land which may contain residual chemicals in soil) of the Project. Therefore, the BAAQMD CEQA significance thresholds as described below were used to evaluate the possibility that emissions of DPM or soil-PM_{10} emissions from Project construction activities would expose the public to potential airborne health risks:

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 1 x 10^{-5} (10 in a million)
- Ground level concentrations of noncarcinogenic air contaminants/pollutants resulting in a HI greater than 1 for the MEI

Operation

Pursuant to BAAQMD CEQA Guidelines,[189] projects that would expose the public to potential airborne health risks in excess of the following thresholds would be considered to have a significant air quality impact:

- Probability of contracting cancer for the MEI exceeds 1 x 10^{-5} (10 in a million)
- Ground level concentrations of noncarcinogenic air contaminants/pollutants resulting in a HI greater than 1 for the MEI

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[188] Ibid.

[189] BAAQMD, *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, December 1999.

$PM_{2.5}$

- BAAQMD does not currently recommend a threshold of significance for determining impacts associated with localized exposures to $PM_{2.5}$, but is addressing this issue in its draft CEQA guidelines. California ARB also has not established a health-protective threshold for $PM_{2.5}$. In the absence of an agency-recommended health-based $PM_{2.5}$ standard, annual average exposures from roadway vehicles within a 150-meter buffer of a sensitive receptor below an action level (0.2 $\mu g/m^3$) identified by SFDPH[190] were considered less than significant for CEQA purposes. The rationale provided by SFDPH for the 0.2 $\mu g/m^3$ action level included studies suggesting that "a change in ambient concentrations of $PM_{2.5}$ by 0.2 $\mu g/m^3$, independent of other vehicle pollutants would result in significant forecasted health impacts" (2008).

- The 0.2 $\mu g/m^3$ identified level is in accord with proposed CEQA guidelines developed by BAAQMD for $PM_{2.5}$.[191] According to BAAQMD, "emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of $PM_{2.5}$ from any source would result in an average annual increase greater than 0.3 $\mu g/m^3$."[192] This determination is based on the lower range of a USEPA proposed Significant Impact Level (SIL) for stationary sources, which is interpreted by the USEPA as the level of ambient impact that is considered to represent a "significant contribution" to regional nonattainment. The BAAQMD goes on to indicate that the USEPA did not design this threshold for addressing community risks and hazards, but it was designed to protect human public health at a regional level by helping an area to maintain the NAAQS. The BAAQMD determined this SIL to be a reasonable goal at the local scale and, therefore, a useful reference for comparison. The BAAQMD states that this proposed threshold (0.3 $\mu g/m^3$) is consistent with the SFDPH threshold of 0.2 $\mu g/m^3$. The BAAQMD reached that conclusion based on an ARB report that determined an increase in mortality from a 0.3 $\mu g/m^3$ increment of $PM_{2.5}$ was consistent with the estimated increase in mortality assumed by SFDPH in identifying the 0.2 $\mu g/m^3$ increment. BAAQMD further states that "On balance, the Air District estimates that the SFDPH threshold and the [District proposed threshold of 0.3 $\mu g/m^3$], in combination with the cumulative threshold for $PM_{2.5}$, will afford similar levels of health protection." BAAQMD is recommending a cumulative threshold for $PM_{2.5}$ of 0.8 $\mu g/m^3$, which is the mid-range USEPA proposed SIL.

Proposed BAAQMD CEQA Thresholds

As presented under the "Regional" discussion in Section III.H.3 (Regulatory Framework), as of the date of this Draft EIR, the BAAQMD is in the process of revising their CEQA guidelines and expects the draft to be approved by their Board of Directors by the end of 2009. On October 7, 2009, the BAAQMD released a draft table of Staff-Recommended CEQA Thresholds of Significance which indicates a number of modifications to existing guidelines, including changes to the maximum daily emissions thresholds for criteria pollutants emissions from operational sources as well as requirements for the quantification of criteria pollutant and TAC emissions from construction activities and comparison to mass emission or risk thresholds, respectively. As these draft guidelines have not been adopted by the BAAQMD's Board of

[190] San Francisco Department of Public Health, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 6, 2008.
[191] BAAQMD, *California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance*. December 7, 2009.
[192] BAAQMD, *California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance*. December 7, 2009, page 43.

Directors, the Project is not subject to the draft requirements. However, the potential impacts of the Project with respect to the draft requirements are discussed at the end of this section.

Analytic Method

Criteria Pollutants

Construction

This analysis takes into account that the Project would implement all PM_{10} control measures recommended by the BAAQMD and required under the *San Francisco Health Code* Article 22B; these will be documented in a Project-specific dust control plan.

Operation

The Project's operational mass emissions of criteria air pollutants were estimated with the URBEMIS 2007[193] model initialized with land use specifications taken from the Project Description and traffic data taken from the Transportation Study.[194]

The Project would generate criteria pollutant emissions from on-site area sources (i.e., natural gas combustion for space and water heating, combustion of other fuels by building and grounds maintenance equipment, etc.). Those area-source emissions were also estimated by the URBEMIS 2007 model based the Project's mix of land uses as defined in the Project Description.

- The Project, at full build-out (2032), would also generate 78,109 daily external motor vehicle trips.[195] The URBEMIS 2007 model was used to calculate the criteria pollutant emissions associated with these trips. For purposes of this analysis, all trips associated with the Project were assumed to be new trips within the SFBAAB, although some portion of the trips attributed to the Project would be likely occur in the region whether or not the Project were developed. Thus, the Project emission estimates represent a conservative analysis of potential new emissions from mobile sources. The Project would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with mixed land uses that would facilitate pedestrian, bicycle, and transit travel. As such, the Project vehicle trip generation would be substantially greater without these trip-reduction features. The Project's transportation analysis estimates that a similar development that did not include the Project's trip reduction features would generate 137,282 daily external motor vehicle trips (about 76 percent more than the Project's daily external motor vehicle trips).[196]

The URBEMIS 2007 files used to develop the criteria pollutant emissions inventory for the Project can be found in Appendix H1.

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[193] Urban Emissions Model (URBEMIS 2007) (Version 9.2.4 – 2008). Rimpo and Associates Inc. Available at: http://www.urbemis.com.
[194] Candlestick Point-Hunter Point Shipyard Phase II Development Plan Transportation Study. Prepared by CHS Consulting Group, Fehr & Peers and LCW Consulting, October 2009.
[195] Ibid.
[196] Ibid.

Carbon Monoxide

The Project's effects on CO concentrations were estimated with the California Department of Transportation's CALINE4 model,[197] as recommended by the BAAQMD for Bay Area conditions, and initialized with traffic data taken from the Transportation Study.[198] The CALINE4 modeling files used to evaluate CO concentrations for the Project can be found in Appendix H1.

Toxic Air Contaminants

Construction

The methods used to analyze the human health effects from emissions of DPM and TAC-containing PM_{10} associated with Project construction activities were developed consistent with BAAQMD, Cal/EPA, and USEPA risk assessment guidance. The analysis incorporates conservative (i.e., health-protective) methodologies for the following: (1) the estimation of emissions, (2) the calculation of airborne concentrations of either DPM or TACs bound to soil-PM_{10} emitted during construction activities at receptor locations, and (3) the estimation of excess lifetime cancer risks and noncancer health effects or HIs. Details of these analyses can be found in Appendix H3, Attachments I (Human Health Risk Assessment of Construction-related DPM) and II (Human Health Risk Assessment of Chemicals Bound to Airborne PM_{10}).

Construction activities associated with the development of Candlestick Point include asbestos and lead paint abatement inside buildings, demolition, grading, excavation, and foundation and structure construction, all of which could generate DPM and some of which could generate dust (PM_{10}) containing contaminated soil. Specifically, construction sources of DPM could include off-road construction equipment such as lifts, loaders, excavators, dozers, and graders spread over a 281-acre area. In addition, the following types of vehicle traffic could contribute to construction-related DPM emissions: equipment and material delivery, spoils and debris hauling, and employee commute. PM_{10} emissions evaluated include demolition and soil grading activities associated with Project construction activities. Those Project areas where PM_{10} emissions were from soils with chemicals present at concentrations above residential cleanup goals were included in the evaluation and chemical concentrations associated with the airborne PM_{10} were estimated based on the chemical concentrations in soils.

Cancer risks and noncancer HIs were evaluated for off-site receptors in the Project vicinity including residents (child and adult), workers and other sensitive receptors (schoolchildren) located in the surrounding community and along the expected travel routes of on-road delivery and haul trucks, including residents at the HPS Phase I location as well as schoolchildren attending schools to the west of the Project area. Additionally, health impacts were evaluated for existing on-site sensitive receptors, including residents at the Alice Griffith Public Housing site. The Project would include redevelopment of Alice Griffith Public Housing to provide one-for-one replacement units, and eligible Alice Griffith Public Housing residents would have the opportunity to move to the new units directly from their existing Alice Griffith Public

[197] California Department of Transportation. CALINE4 – A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways, FHWA/CA/TL-84/15, Final Revision June 1989. http://www.dot.ca.gov/hq/env/air/pages/CO.htm.
[198] Candlestick Point-Hunter Point Shipyard Phase II Development Plan Transportation Study. Prepared by CHS Consulting Group, Fehr & Peers and LCW Consulting, October 2009.

Housing units without having to relocate to any other area. Therefore, while construction would occur at one parcel, residents would continue to reside at the remaining parcels. As such, these residents have been identified as on-site receptors during Project construction.

Airborne concentrations of DPM and TACs bound to soil-PM_{10} were estimated at receptor locations using the emissions estimates and the USEPA–recommended air dispersion model American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), version 07026. Based on the results of the exposure evaluation and air dispersion modeling, quantitative estimates of excess lifetime cancer risks and noncancer HIs associated with potential exposure to Project-related emissions were developed. The methods used to estimate excess lifetime cancer risks and noncancer HIs are consistent with risk assessment guidance from BAAQMD, Cal/EPA, and USEPA.

For the purposes of conducting the HRA of DPM, the Project, with construction of a new 49ers stadium, would involve the longest construction period and the heaviest use of construction equipment and would represent the greatest increase in potential human health risks from construction activities as compared to all other variants and alternatives (refer to Chapter IV [Project Variants] for further discussion of Project variants). It would be assumed that if exposures and associated risk estimates for the Project were below BAAQMD thresholds, the risks associated with the Project variants development program would also be below thresholds.

Since the HRAs for DPM or TACs bound to soil-PM_{10} emitted during construction activities were completed, changes were made to the Project Description including the addition of roadway improvements on Ingerson and Jamestown Avenues, change in the Candlestick Point construction schedule (completion in 2031), and slight changes to the Candlestick Point phasing boundaries. These changes to the Project Description were found not to change the HRA conclusions significantly, as documented in a technical memorandum included in Appendix H3, Attachment VI.

Operation

Based on the type of uses permitted under the Project, the potential for TACs to be emitted by the Project and affect nearby receptors would likely only occur within areas designated for R&D uses, which would be restricted to HPS Phase II. Because the Project land use designations provide that a wide range of development can operate in the R&D areas within the HPS Phase II site, the exact type of stationary sources and quantity of the emissions from those sources are not known. As a result, a conservative scenario was established so that the impact of the potential aggregate emissions from all future TAC emission sources in these R&D areas could be evaluated at surrounding receptor locations. Details regarding this assessment can be found in Appendix H3, Attachment III.[199]

For this prospective screening-level analysis, a series of conservative assumptions was made:

- A wide range of stationary sources could operate in the R&D area; thus, the identity and amounts of the TACs emitted from these sources cannot be determined at this time.
- In order to approximate the maximum potential number of facilities with TAC emitting sources, the area designated for proposed R&D development would be divided into one-acre plots, which is

[199] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, May 4, 2010. See Appendix H3.

- generally consistent with the minimum size of a parcel based on the expected land uses within the R&D parcels.
  - A single R&D facility (or a stationary source such as a collection of emitting sources like boilers, emergency generators, etc.) would be constructed on the one-acre plot.
  - The cancer risk at the boundary of each one-acre plot was set not to exceed a designated cancer risk level or chronic noncancer HI threshold (in this case a residential cancer risk of 10 in one million and a chronic noncancer HI of 1.0, in accordance with BAAQMD thresholds of significance).
  - It was conservatively assumed that all receptor locations surrounding the R&D area were residential.

Potential health impacts of this scenario were evaluated at receptor locations within approximately 500 meters (about a third of a mile) of the R&D areas. Impacts would be lower beyond this distance. In addition, the TAC analysis conservatively used a total of 5 million square feet of R&D uses, the amount proposed in Variant 1. Refer to Chapter IV for further discussion of Project variants. It would be assumed that if exposures and associated risk estimates for that total R&D use were below health risk thresholds, the risks associated with the Project R&D program of 2.5 million square feet would also be below thresholds. For this screening evaluation, all surrounding receptors were conservatively evaluated as residential receptors (i.e., potential exposures/risks for other populations would be less, as the exposure frequency and duration would be less than a residential scenario).

Although excess lifetime cancer risk and chronic noncancer HIs were explicitly evaluated, acute risks were not evaluated, as it would be highly unlikely that all emissions sources would be operating at their maximum emission rate at the same time (e.g., for any single hour).

$PM_{2.5}$

- Although not required as part of the criteria pollutant analysis, the incremental increase in the concentration of vehicular emissions of $PM_{2.5}$ associated with the Project that would occur along selected roadways were compared to the 0.2 $\mu g/m^3$–identified action level. The details of the HRA for $PM_{2.5}$ can be found in Appendix H3, Attachment IV.

Emissions from vehicle exhaust, tire wear, and brake wear were estimated using the most recent version of the Emission Factor model (EMFAC), developed by the California ARB, modified to account for emission reduction regulations recently implemented by California ARB which have not yet been incorporated into EMFAC. Vehicle traffic data for the Project were taken from the transportation technical report.[200]

The concentration of $PM_{2.5}$ from vehicular emissions was characterized by developing exposure point concentrations at residential receptors surrounding the thoroughfares and roadways evaluated: Third Street; Innes Avenue/Hunters Point Boulevard/Evans Avenue; Palou Avenue; Gilman Avenue/Paul Avenue; Jamestown Avenue; Ingerson Avenue; and Harney Way. Those thoroughfares would connect the Project and major arterials to US-101 or downtown San Francisco. In addition, Innes Avenue/Hunters

- Point Boulevard/Evans Avenue and Harney Way were identified as streets with truck traffic and thus would be expected to yield more $PM_{2.5}$ compared to other roads. Palou Avenue and Gilman Avenue/Paul Avenue were evaluated quantitatively as there are residences in the vicinity of these roads where individuals

[200] Candlestick Point-Hunter Point Shipyard Phase II Development Plan Transportation Study. Prepared by CHS Consulting Group, Fehr & Peers and LCW Consulting, October 2009.

may incur exposure to $PM_{2.5,}$ while Jamestown and Ingerson Avenues were evaluated in a semi-quantitative manner as they are immediately adjacent to residences; however, have much lower expected Project-related vehicle traffic than Palou and Gilman/Paul.

- Annual average airborne concentrations of $PM_{2.5}$ attributable to Project-related traffic emissions were estimated by applying a Gaussian air dispersion model, CAL3QHCR, which has been approved by the USEPA and California ARB for use in the environmental documentation of transportation projects. Both free flowing traffic and queuing at intersections were evaluated.

Construction Impacts

Impact AQ-1: Criteria Pollutants

Impact AQ-1 **Construction activities associated with the Project would not result in short-term increases in emission of criteria air pollutants and precursors that exceed BAAQMD CEQA significance criteria. (Less than Significant with Mitigation)** ***[Criteria H.b and H.d]***

Construction of the Project is anticipated to occur continuously for approximately 20 years. Construction activities would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

Heavy construction activity on dry soil exposed during construction phases would cause emissions of dust. Throughout construction, pollutant emissions could vary day to day, depending on the specific phase. When considered in the context of long-term Project operations, demolition and construction-related emissions would be temporary, but these activities still could cause potentially significant effects on local air quality.

According to the BAAQMD, PM_{10} is the pollutant of greatest concern with respect to construction-related emissions.[201] Although heavy-duty equipment, material transport, and employee commutes result in emissions of criteria air pollutants (e.g., CO) and precursors (e.g., ROG and NO_X), these emissions are included in the regional emissions inventory, which serves as the basis for the air quality plans, and are not expected to impede attainment of the ozone standard or maintenance of the CO standard in the SFBAAB. Consequently, the BAAQMD has not adopted mass emission thresholds for construction-related emissions of ROG and NO_X and bases its determination of significance on consideration of the fugitive PM_{10} dust control measures to be implemented.[202]

To minimize dust emissions, *San Francisco Health Code* (Article 22B) and the BAAQMD[203] have identified a set of control measures. Implementation of MM HZ-15, which would require the Applicant to ensure that

[201] Ibid.
[202] Ibid.
[203] Ibid.

construction contractors comply with the dust control strategies included in an approved dust control plan as part of a site-specific dust control plan, would reduce the impacts caused by construction dust to a less-than-significant level.

Impact AQ-2: DPM from Construction Activities

As described earlier, an HRA[204] evaluated potential human health effects due to exposure to DPM from heavy equipment exhaust that may be emitted during Project-related construction activities including abatement, demolition, grading, excavation, and foundation and structure construction. Specifically, the construction sources of DPM evaluated include off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. Potential exposures to DPM from on-road diesel trucks that transport construction materials and debris from the Project to the nearest freeways were also evaluated. On-road sources of DPM include on-road equipment such as haul trucks, and on-road support vehicles (e.g., pick-ups) as well as emissions associated with workers commuting to the Project site. DPM emissions from these activities were estimated assuming the following mitigation were in place:

- Construction equipment used for the Project would utilize a phased-in emission control technology in advance of a regulatory requirement such that 50 percent of the fleet will meet USEPA Tier 2 standards outfitted with California ARB Level 3 VDECS (Verified Diesel Emission Control Strategies) for particulate matter control (or equivalent) during the first two years of construction activities, increasing to 75 percent of the fleet in the third year and 100 percent of the fleet starting in the fourth year and for the duration of the Project
- Construction equipment used in the Alice Griffith parcels (CP01 through CP06) would utilize equipment which meets the USEPA Tier 2 standards outfitted with California ARB Level 3 VDECS (Verified Diesel Emission Control Strategies) for particulate matter control (or equivalent) throughout the entire duration of construction activities on those parcels.

Potential exposures to DPM from proposed Project construction activities were evaluated for off-site receptors in the vicinity of the Project and the expected travel routes of on-road diesel haul trucks (e.g., (adult and child residents, workers, and schoolchildren). Potential exposures to DPM by potential on-site residents within the Alice Griffith Housing area were also evaluated. As discussed earlier, airborne concentrations of DPM were estimated at receptor locations using the emissions estimates and the USEPA–recommended air dispersion model, AERMOD. Based on the results of the exposure evaluation and air dispersion modeling, quantitative estimates of excess lifetime cancer risks and noncancer HIs associated with potential exposure to Project-related emissions were developed. The methods used to estimate excess lifetime cancer risks and noncancer HIs are consistent with risk assessment guidance from BAAQMD, Cal/EPA, and USEPA.

[204] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, May 4, 2010. See Appendix H1.

Impact of Candlestick Point

Impact AQ-2a **Construction at Candlestick Point would not result in impacts to off-site populations from Project-generated emissions of DPM. (Less than Significant with Mitigation) *[Criterion H.d]***

As noted earlier, BAAQMD CEQA Guidelines has an established threshold of 10 in one million for carcinogenic health risks. The HRA which took into account the mitigation measures described above concluded that the cancer risk at the MEI would be 3.3 in one million. This represents the maximum level of DPM experienced by all off-site sensitive receptors during Candlestick Point construction activities. Exposure to DPM from construction activities associated with Candlestick Point would not exceed the threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.007, which is below the BAAQMD's significance threshold of 1.0.

The impact of Candlestick Point construction activities without the mitigation described above would result in an estimated cancer risk at the MEI of 11 in one million, above the significance threshold of 10 in one million and, therefore, significant without mitigation. The corresponding chronic noncancer HI for the unmitigated emissions was estimated to be 0.027, which is below the BAAQMD's noncancer HI significance threshold of 1.0.

Due to the scale of the construction activities and proximity to adjacent receptors, without mitigation the impacts would be potentially above the BAAQMD's significance threshold and would, therefore, be potentially significant.

As the carcinogenic and noncarcinogenic health risks posed by DPM emissions during construction activities associated with development of Candlestick Point have been determined to be below established thresholds with mitigation, this impact is less than significant with mitigation measure MM AQ-2.1:

MM AQ-2.1 *Implement Emission Control Device Installation on Construction. To reduce DPM emissions during Project construction, the Project Applicant shall require construction equipment used for the Project to utilize emission control technology such that 50% of the fleet will meet USEPA Tier 2 standards outfitted with California ARB Level 3 VDECS (Verified Diesel Emission Control Strategies) for particulate matter control (or equivalent) during the first two years of construction activities, increasing to 75% of the fleet in 2012 and 100% of the fleet starting in 2013 and for the duration of the Project.*

Impact of Hunters Point Shipyard Phase II

Impact AQ-2b **Construction at HPS Phase II would not result in impacts to off-site populations from Project-generated emissions of DPM. (Less than Significant with Mitigation) *[Criterion H.d]***

As noted above, BAAQMD CEQA Guidelines has an established threshold of 10 in one million for carcinogenic health risks; the HRA which took into account the mitigation measures described above concluded that the cancer risk at the MEI would be 3.8 in one million. This represents the maximum level of DPM experienced by all off-site sensitive receptors during HPS-Phase II construction activities. Construction activities associated with HPS Phase II would not exceed the threshold. In addition, the HRA concluded the maximum chronic non-cancer HI to be 0.01, which is below the BAAQMD's significance threshold of 1.0. The impact of HPS Phase II construction activities without the mitigation described

above would result in an estimated cancer risk at the MEI of 8.4 in one million, which is below the significance threshold of 10 in one million and, therefore, less than significant without mitigation. The corresponding chronic noncancer HI for the unmitigated emissions was estimated to be 0.024, which is below the BAAQMD's noncancer HI significance threshold of 1.0.

Due to the scale of the construction activities and proximity to adjacent receptors, without mitigation the impacts would be potentially above the BAAQMD's significance threshold and would, therefore, be potentially significant.

As the carcinogenic and noncarcinogenic health risks posed by DPM emissions during construction activities associated with development of HPS-Phase II have been determined to be below established thresholds with and without mitigation, this impact is less than significant with implementation of mitigation measure MM AQ-2.1.

Impact of Alice Griffith Public Housing

Impact AQ-2c **Construction activities associated with the Project would not result in impacts to the existing Alice Griffith Public Housing from Project-generated emissions of DPM. (Less than Significant with Mitigation) *[Criterion H.d]***

As noted earlier, BAAQMD CEQA Guidelines has an established threshold of 10 in one million for carcinogenic health risks; the HRA which took into account the mitigation measures described above concluded that the cancer risk at the MEI inside Alice Griffith would be 4.5 in one million. This represents the maximum level of DPM experienced by all on-site sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the threshold. In addition, the HRA concluded the maximum chronic non-cancer HI to be 0.02, which is below the BAAQMD's significance threshold of 1.0.

The impact of Candlestick Point and HPS Phase II construction activities without the mitigation described above would result in an estimated cancer risk at the on-site MEI (sensitive receptors inside Alice Griffith) of 20 in one million, above the significance threshold of 10 in one million and therefore significant without mitigation. The corresponding chronic noncancer HI for the unmitigated emissions was estimated to be 0.09, which is below the BAAQMD's noncancer HI significance threshold of 1.0.

Due to the scale of the construction activities and proximity to adjacent receptors, without mitigation the impacts would be potentially above the BAAQMD's significance threshold and would therefore be potentially significant.

As the carcinogenic and noncarcinogenic health risks posed by DPM emissions during construction activities associated with development of the Project have been determined to be below established thresholds with mitigation, this impact is less than significant with implementation of mitigation measure MM AQ-2.1 and mitigation measure MM AQ-2.2:

MM AQ-2.2 *Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels. In addition to mitigation measure MM AQ-2.1, in order to minimize the potential impacts to residents living in Alice Griffith from the construction activities in that area, the Project Applicant will require that all construction equipment used in the Alice Griffith parcels (CP01 though*

CP06) would utilize equipment which meets the USEPA Tier 4 engine standards for particulate matter control (or equivalent) throughout the entire duration of construction activities on those parcels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact AQ-2 Construction activities associated with the Project would not result in impacts to on-site and off-site populations from Project-generated emissions of DPM. (Less than Significant with Mitigation) *[Criterion H.d]*

As noted earlier, BAAQMD CEQA Guidelines has an established threshold of 10 in one million for carcinogenic health risks; the HRA which took into account the mitigation measures described above concluded that the inhalation cancer risk at the on-site and off-site MEI would be 4.5 in one million. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.01, which is below the BAAQMD's noncancer HI significance threshold of 1.0.

The impact of Candlestick Point and HPS Phase II construction activities without the mitigation described above would result in an estimated cancer risk at the on-site and off-site MEI of 20 in one million, above the significance threshold of 10 in one million and therefore significant without mitigation. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. The corresponding chronic noncancer HI for the unmitigated emissions was estimated to be 0.09, which is below the BAAQMD's noncancer HI significance threshold of 1.0.

Due to the scale of the construction activities and proximity to adjacent receptors, without mitigation the impacts would be potentially above the BAAQMD's significance threshold and would, therefore, be potentially significant.

As the carcinogenic and noncarcinogenic health risks posed by DPM emissions during construction activities associated with development of HPS Phase II have been determined to be below established thresholds with mitigation in place, this impact is less than significant with implementation of mitigation measure MM AQ-2.1 and mitigation measure MM AQ-2.2.

Impact AQ-3: TACs from Construction Activities

Within the HPS Phase II site, there are many existing structures associated with ship repair, piers, dry-docks, storage, administrative, and other former Navy uses. Most of these structures are currently vacant, but the materials historically used in association with operation of these facilities have resulted in a number of hazardous materials release sites and associated contaminated soils. The types, levels, and extent of contamination of soils and other environmental media have been identified for the HPS Phase II area through a series of comprehensive environmental investigations conducted at the direction of the Navy. The Navy is currently in the process of remediating on-site conditions but some of the remedial activities may be conducted after approval of the Project, and, therefore, the current on-site conditions are considered during the evaluation of potential health hazards as a result of development of HPS Phase II. Similar to the activities described above for Candlestick Point, demolition and soil grading activities associated with HPS Phase II could release TACs bound to soil-PM_{10} into the air and pose potential health risks to nearby receptors on and off site. As described earlier, an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at

numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity.

In order to determine the concentration of TACs in soils during Project construction activities, a number of site investigations and HHRAs were evaluated for HPS and CP.

- HPS—The Navy directed a series of comprehensive environmental investigations and HHRAs at the former HPS. The selection of areas and chemicals for evaluation in this HHRA is based on information and analytical results presented in the Navy HHRA reports. The Navy applied a consistent investigation and risk assessment approach for each of the Parcels. Specifically, each Parcel was divided into "redevelopment blocks," corresponding to the future reuse (e.g., residential or recreational) outlined in the Hunters Point Shipyard Redevelopment Plan (San Francisco Redevelopment Agency [SFRA] 1997). The Navy HHRAs identified the proposed future use and associated soil cleanup levels (corresponding to residential, industrial, or recreational levels) for each redevelopment block. The selection of areas for evaluation in this HHRA was based on the environmental condition of the Parcels and/or redevelopment blocks within a Parcel at the time Project construction activities will commence, as provided by the Project Applicant. Specifically, if a redevelopment block (within a Parcel) is designated for residential use (including mixed use), it was assumed that the redevelopment block had been remediated to residential cleanup levels prior to construction activities, and the redevelopment block was excluded from the analysis; all remaining redevelopment blocks within a Parcel were identified for quantitative evaluation. This is a conservative approach in that it is possible that areas designated for nonresidential uses will also have been remediated prior to construction activities. However, because residual concentrations in soil in these areas may remain above residential levels, as a screening-level approach, it was conservatively assumed that nonresidential areas had not been remediated.
- CP—Analytical results for chemicals in soils within the CP area were available from two investigations conducted by Geomatrix Consultants, Inc.: *Site Investigation and Risk Evaluation Report for the Proposed San Francisco 49ers Stadium and Mall Site: North Park and Last Port Areas*[205] and *Addendum 1 to the Site Investigation and Risk Evaluation Report for the Proposed San Francisco 49ers Stadium and Mall Site: North Park and Last Port Areas*.[206]

Emissions of soil PM_{10} from construction activities were estimated assuming the mitigation measures discussed in MM HZ-15. Projected emissions without these mitigation measures were not quantified. As discussed earlier, airborne concentrations of TACs bound to soil-PM_{10} were estimated at receptor locations using the emissions estimates and the USEPA–recommended air dispersion model, AERMOD. Based on the results of the exposure evaluation and air dispersion modeling, quantitative estimates of excess lifetime cancer risks and noncancer HIs associated with potential exposure to Project-related emissions were developed. The methods used to estimate excess lifetime cancer risks and noncancer HIs are consistent with risk assessment guidance from BAAQMD, Cal/EPA, and USEPA.

[205] Geomatrix Consultants. 1998. Site Investigation and Risk Evaluation Report for the Proposed San Francisco 49ers Stadium and Mall Site: North Park and Last Port Areas. San Francisco, California. Volume I of IV.
[206] Geomatrix Consultants. 1998. Addendum 1 to the Site Investigation and Risk Evaluation Report for the Proposed San Francisco 49ers Stadium and Mall Site: North Park and Last Port Areas. Candlestick Point, San Francisco, California. Volume I of II.

Impact of Candlestick Point

Impact AQ-3a **Construction at Candlestick Point would not result in impacts to off-site and Alice Griffith populations from emissions of TACs bound to soil-PM_{10}. (Less than Significant with Mitigation) *[Criterion H.d]***

Historical operations within the Candlestick Point site have increased the concentration levels of certain metals and/or organic compounds in the on-site soils. During construction activities (demolition and soil grading) associated with development at Candlestick Point, these chemicals could be released into the air, bound to dust particles or particulate matter (PM_{10}) and pose health risks to nearby receptors on- and off site. As described earlier, an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity.

As noted above, BAAQMD CEQA Guidelines has an established threshold of 10 in 1 million for carcinogenic health risks; the inhalation cancer risk at the point of maximum impact or MEI as a result of construction activities at the Candlestick Point would be 0.04 in one million. This represents the maximum level of PM_{10} experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM_{10} from construction activities associated with Candlestick Point would not exceed the threshold.

In addition, the HRA concluded the maximum non-cancer HI to be 0.01, which would be below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of Candlestick Point have been determined to be below established thresholds, this impact is less than significant with mitigation measure MM HZ-15 discussed above. An analysis was not conducted to determine the impact of Project construction activities without the dust control mitigation measures described in MM HZ-15 because the dust controls described in MM HZ-15 are required by *San Francisco Health Code* Article 22B or BAAQMD regulations. Due to the scale of the construction activities and proximity to adjacent receptors, without these dust control measures, the impacts from TACs bound to soil PM_{10} would likely be above the BAAQMD's significance threshold and would, therefore, be potentially significant.

Impact of Hunters Point Shipyard Phase II

Impact AQ-3b **Construction at HPS Phase II would not result in impacts to off-site and Alice Griffith populations from emissions of TACs bound to soil-PM_{10}. (Less than Significant with Mitigation) *[Criterion H.d]***

Historical operations within the HPS Phase II site have increased the concentrations of certain metals and/or organic compounds in the on-site soils. During construction activities (demolition and soil grading) associated with development at HPS Phase II, these chemicals could be released into the air, bound to dust particles or particulate matter (PM_{10}) and pose health risks to nearby receptors on and off site. As described earlier, an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity.

As noted above, BAAQMD has an established threshold of 10 in 1 million for carcinogenic health risks; the inhalation cancer risk at the point of maximum impact or MEI as a result of construction activities at the HPS Phase II site would be 0.01 in one million. This represents the maximum level of PM_{10} experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM_{10} from construction activities associated with Candlestick Point would not exceed the threshold.

In addition, the HRA concluded the maximum non-cancer HI to be 0.03, which would be below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of HPS Phase II have been determined to be below established thresholds, this impact is less than significant with mitigation measure MM HZ-15 discussed above. An analysis was not conducted to determine the impact of Project construction activities without the dust control mitigation measures described in MM HZ-15 because the dust controls described in MM HZ-15 are required by *San Francisco Health Code* Article 22B or BAAQMD regulations. Due to the scale of the construction activities and proximity to adjacent receptors, without these dust control measure, the impacts from TACs bound to soil PM_{10} would likely be above the BAAQMD's significance threshold and would, therefore, be potentially significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact AQ-3 **Construction activities associated with the Project would not result in impacts to off-site and Alice Griffith populations from emissions of TACs bound to soil-PM_{10}. (Less than Significant with Mitigation) *[Criterion H.d]***

As discussed earlier, construction activities at both Candlestick Point and HPS Phase II have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity.

As noted above, BAAQMD has an established threshold of 10 in 1 million for carcinogenic health risks; the inhalation cancer risk at the point of maximum impact or MEI as a result of construction activities at the Project would be 0.04 in one million. This represents the maximum level of PM_{10} experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM_{10} from construction activities associated with Candlestick Point would not exceed the threshold.

In addition, the HRA concluded the maximum non-cancer HI to be 0.03, which would be below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of HPS Phase II have been determined to be below established thresholds, this impact is less than significant with mitigation measure MM HZ-15 discussed above. An analysis was not conducted to determine the impact of Project construction activities without the dust control mitigation measures described in MM HZ-15 because the dust controls described in MM HZ-15 are required by *San Francisco Health Code* Article 22B or BAAQMD regulations. Due to the scale of the construction activities and proximity to adjacent receptors, without these dust control measure, the impacts

from TACs bound to soil PM_{10} would likely be above the BAAQMD's significance threshold and would, therefore, be potentially significant.

Operational Impacts

Impact AQ-4: Criteria Pollutants

Impact AQ-4 **Operation of the Project would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full buildout. (Significant and Unavoidable)** ***[Criteria H.a and H.c]***

The proposed Project's design incorporates a dense, compact development plan that includes a diverse mix of land uses that are well connected with regional mass transit systems. The analysis of Project emissions in the criteria pollutant emission inventory assumed certain Project features. The land use mixes and basic land plan design proposed in the Project Description are fundamental aspects of the Project and include certain features assumed in the criteria pollutant emissions inventory, including providing neighborhood-serving retail; providing automobile, public transportation and pedestrian connections between the Shipyard, Candlestick Point, and the larger BVHP neighborhood; providing for transportation and open space corridors; and integrating land use patterns with a multimodal street network that facilitates walking and cycling for internal trips and transit for trips of greater distance. Other Project features assumed in the criteria pollutant emission inventory are more conceptual, such as landscape plans and plans related to energy efficiencies in building design. Further, transportation features proposed as part of the Project that would be implemented in part by San Francisco Municipal Transportation Agency (SFMTA) are identified in Section III.D (Transportation and Circulation) as mitigation measures. With these features included, the proposed Project at full buildout is expected to generate 78,109 daily external motor vehicle trips. In contrast, the proposed Project's Transportation Study estimates that a similar development not including the above-mentioned design features (termed the "Business as Usual" or BAU scenario) would generate 137,282 daily external motor vehicle trips (about 76 percent more).

The estimates of average daily operational emissions for the proposed Project used the CARB's URBEMIS 2007 computer model initialized with land use specifications from the Project Description and daily vehicle trip and average trip length estimates taken from the Transportation Study. Table III.H-5 (Operational Criteria Pollutant Emissions [Year 2030]) presents the emission modeling with comparisons to BAAQMD thresholds and the transportation scenario without trip reduction features (referred to as the Business as Usual [BAU] scenario). The estimated daily criteria pollutant emissions associated with the proposed Project and the BAU scenario are shown in Table III.H-5 in comparison with each other and with the BAAQMD CEQA significance criteria. Although the Project would generate substantially fewer emissions than the BAU scenario (i.e., from 14 to 50 percent less than BAU depending on the pollutant), Project emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ would exceed the BAAQMD thresholds. No additional feasible mitigation measures have been identified that would further reduce the Project's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

Table III.H-5 Operational Criteria Pollutant Emissions (Year 2030)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Candlestick Point					
Area*	449	70	53	4	4
Motor Vehicles (External)	217	195	2,224	1,026	193
Subtotal	***666***	***265***	***2,276***	***1,029***	***197***
HPS Phase II					
Area*	166	38	30	1	1
Motor Vehicles (External)	88	80	916	423	80
Subtotal	***255***	***119***	***947***	***424***	***81***
Project					
Area*	616	108	83	5	5
Motor Vehicles (External)	305	275	3,140	1,449	273
Motor Vehicles (Internal)	24	11	184	36	7
All Sources (Project)	***945***	***394***	***3,406***	***1,490***	***285***
BAAQMD Significance Threshold	80	80	None	80	None
Project Exceeds BAAQMD Threshold?	Yes	Yes	No	Yes	No
Comparison to Business as Usual (BAU)					
BAU Project					
Area*	616	108	83	5	5
Motor Vehicles	485	476	5,292	2,561	567
All Sources BAU	***1,101***	***585***	***5,375***	***2,566***	***572***
Project Reduction from BAU	-14%	-33%	-37%	-42%	-50%

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4; model input/output in included in Appendix H1.

Daily emissions of ROG and NO_X were calculated under summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest. http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Pollutants.aspx

* Area emissions are from sources located on the Project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

— BAAQMD significance threshold for CO is based on air concentration and not mass emission rates.

However, the Project design is a dense, infill mixed-use project, with a transit-oriented design, which is consistent with Senate Bill 375 as well as the San Francisco's sustainable city initiatives to reduce emissions, on a per-capita basis by its very nature. However, the BAAQMD CEQA guidelines list a total mass of criteria pollutants as its CEQA threshold. Accordingly, a large project, such as this one, regardless of its design and location will always exceed these mass-based thresholds.

Impact AQ-5: Carbon Monoxide

Impact AQ-5 **Operation of the Project would not cause local concentrations of CO to exceed State and federal ambient air quality standards due to motor vehicles trips. (Less than Significant) *[Criterion H.b]***

Project increases in traffic on streets would contribute to localized CO emissions. CALINE4 dispersion modeling to determine local CO concentrations was performed for receptors near four intersections in the adjacent Bayview residential neighborhood. These intersections were selected because they represent the locations where Project traffic would produce the greatest change in traffic level of service associated with the Project (and, therefore, the greatest increase in congestion, which would produce the greatest increase in CO emissions) and/or the highest total traffic volumes of all intersections in the Project vicinity. Table III.H-6 (Carbon Monoxide Concentrations at Selected Intersections in the BHVP Neighborhood) presents CO concentrations and shows that the Project would not cause exceedances of the state and federal standards. Other intersections affected by Project traffic and at a further distance from the Project would be expected to have CO concentration levels similar to or lower than the four analyzed intersections. Therefore, the Project effects on ambient CO standards would be less than significant. No mitigation is required.

Table III.H-6 Carbon Monoxide Concentrations at Selected Intersections in the BVHP Neighborhood

	One-Hour Average CO (ppm)[a]			*Eight-Hour Average CO (ppm)[a]*		
Intersection	*Existing (2009)*	*Future Baseline (2030)*	*Future Project (2030)*	*Existing (2009)*	*Future Baseline (2030)*	*Future Project (2030)*
Arelious Walker Dr./Gilman Ave.	2.5	2.7	3.1	1.6	1.7	2.0
Third St. / Gilman Ave.	3.1	2.9	3.2	2.0	1.9	2.1
Griffith St. / Palou Ave.	2.7	2.7	2.8	1.7	1.7	1.8
Evans Ave. / Jennings St.	2.9	3.0	3.0	1.9	2.0	2.0

SOURCE: PBS&J, 2008; model input/output in included in Appendix H1.

The BAAQMD recommends that the current CO background for use with CALINE4 be chosen as the second highest recorded value over the last two years at the nearest BAAQMD station (i.e., the Arkansas Street station on Potrero Hill, in this case); these background levels are shown below. The California ARB has estimated San Francisco's CO emissions through the year 2020, but not for more distant future years; such CO emissions show a steady decrease over time at least up to 2020. Consequently, the current CO background levels were also used as the 2030 background levels, a conservative approach considering that 2030 levels are likely to be lower than current levels since ambient concentrations generally follow emission trends.

CO Background:
1-hour average: 3.6 ppm
8-hour average: 2.0 ppm

Ambient CO Standards:
1-hour average—federal: 35 ppm; state 20 ppm
8-hour average—federal and state: 9 ppm

a. Calculations reflect CO levels at 25 feet from roadside.

Impact AQ-6: Toxic Air Contaminants

Impact AQ-6 **Implementation of HPS Phase II would not expose nearby receptors to an increase in local concentrations of toxic air contaminants due to the operation of Research and Development uses. (Less than Significant with Mitigation) *[Criterion H.d]***

The Project would include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the East of the proposed stadium and south of the proposed residential areas. As the predominant winds are out of the West, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors.

Depending on the type of activity conducted at these planned R&D facilities, airborne TAC could be emitted. As the Project land use designations provide that a wide range of stationary sources could operate within the R&D uses, the exact type of stationary sources and quantity of TAC emissions from those sources are not known. However, for the purposes of this analysis, a conservative scenario of potential TAC emissions from each potential future source of TACs was modeled to estimate the potential health impact on nearby receptor locations. It was assumed that each allowable location for TAC emissions would emit chemicals at the maximum allowable rate, when, in fact, the TAC emissions at some of these locations within the R&D area would be below the maximum rate (for example, office building emissions for TAC would be zero or close to zero).

Using the assumptions discussed in the Analytic Method section, the HRA[207] estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. All receptors were initially evaluated as residential receptors. The estimated excess lifetime cancer risks and HIs within areas designated for residential use were found not to exceed the BAAQMD's significance thresholds of an incremental residential cancer risk of 10 in one million for carcinogenic and a chronic noncancer HI of 1.0 for noncarcinogenic health risks. An analysis was not conducted to determine the impact without the assumptions discussed earlier (such as the assumptions that each lot would be 1 acre in size and have one source of TAC emissions); however, due to the potential number of R&D facilities with sources of TAC emissions capable of locating in the R&D areas and their proximity to adjacent receptors, without mitigation, the impacts would potentially be above the BAAQMD's significance threshold and therefore potentially significant.

The estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space or stadium that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have a HI of 1.6. However, as noted above, this receptor location would be in an area designated as open space or stadium use, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0.

[207] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, May 4, 2010. See Appendix H3.

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project, including implementation of the following mitigation measures. The mitigation measures would require TAC emitting facilities that are located on a lot 1 acre or larger in size to establish that their TAC emissions are below the BAAQMD thresholds. If they exceed these thresholds, or if a TAC emitting facility locates on a lot smaller than 1 acre in size, the facility would further need to analyze the effect of its emissions in combination with other TAC emitting facility emissions to establish that the combined emissions would be below the BAAQMD thresholds. Impacts would be less than significant.

MM AQ-6.1 *If a facility with sources of TAC emission wishes to locate on a plot size smaller than 1 acre, an analysis will be required to show the facility, in conjunction with all other TAC emitting facilities in the R&D areas, will not cause these thresholds of a residential cancer risk of 10 in one million and a chronic noncancer HI of 1.0 to be exceeded at the nearest residential locations.*

MM AQ-6.2 *Each facility with sources of TAC emissions on a plot of 1 acre or larger will limit their emissions such that residential cancer risk and chronic non-cancer hazard index evaluated at the facility boundary does not exceed 10 in one million or 1.0, respectively. If these thresholds are exceeded at the boundary, an analysis will be required to show the facility, in conjunction with all other TAC emitting facilities in the R&D areas, will not cause these thresholds to be exceeded at the nearest residential locations.*

Impact AQ-7: Traffic $PM_{2.5}$

Impact AQ-7 **Operation of the Project would not expose receptors to concentrations of $PM_{2.5}$ above a 0.2 μg/m³ action level for $PM_{2.5}$ and, therefore, would not substantially affect the health of nearby receptors as a result of an increase in local concentrations of vehicle emissions ($PM_{2.5}$) associated with vehicle use attributable to operation of the Project. (Less than Significant) *[Criterion H.d]***

With development of the Project, vehicle trips and thereby vehicle emissions along local roadways would increase. The exposure of residential receptors to increased vehicle emissions could affect human health. As a result, and as discussed above, potential $PM_{2.5}$ concentrations at select roadways with the addition of Project traffic were estimated compared against an identified 0.2 μg/m³ action level to determine whether sensitive receptors would be exposed to a substantial increase in $PM_{2.5}$ concentrations attributed to vehicle emissions that would be associated with the Project. Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

With the addition of Project-related traffic, no receptors along the streets listed above would experience and increase in $PM_{2.5}$ concentrations in excess of the identified 0.2 μg/m³ action level. The details of the

HRA for $PM_{2.5}$ can be found in Appendix H3, Attachment IV. As concentrations of $PM_{2.5}$ at sensitive receptor locations would not exceed the identified 0.2 $\mu g/m^3$ action level, impacts would be less than significant. No mitigation is required.

Impact AQ-8: Odors

Impact AQ-8 **Implementation of the Project would not generate objectionable odors affecting a substantial number of people. (Less than Significant) *[Criterion H.e]***

According to the current BAAQMD CEQA Guidelines, odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that the BAAQMD regards with potential to generate considerable odors include: wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, oil refineries and chemical plants. The Project would be a large mixed-use development containing residential, office, retail, R&D, recreational, and entertainment uses. Although there may be some potential for small-scale, localized odor issues to emerge around Project sources such as solid waste collection, food preparation, etc., substantial odor sources and consequent effects on on-site and off-site sensitive receptors would be unlikely and would be resolved by interventions after receipt of any complaints. This would be a less-than-significant impact. No mitigation is required.

Impact AQ-9: Consistency with Regional Air Plans

Impact AQ-9 **The Project would conform to the current regional air quality plan. (Less than Significant) *[Criterion H.a]***

The most current air quality plan for the BAAQMD is the *Bay Area 2005 Ozone Strategy*. The BAAQMD is currently drafting its *2009 Clean Air Plan (CAP)*, which represents a unique approach to air planning, by including GHGs as well as criteria pollutants and TACs. For the 2005 Plan, the travel activity adjustments used in preparing the on-road mobile source inventory for the 2005 Plan are the same as were used in the Transportation Air Quality Conformity Analysis for the MTC's *Transportation 2030*. MTC's travel demand model utilizes regional demographic forecasts from ABAG's socioeconomic and population projections, in this case, *Projections 2003*. The bulk of the emissions into the air from the Project stems from the operation of mobile sources, accordingly, to evaluate consistency, a review of the mobile source emissions are needed. Both the draft CAP and the 2005 Plan emphasize the need for smart growth and a reduction of single automobile usage. The Project is consistent with these plans, in that it promotes the use of alternative transportation modes, such as transit, biking and walking. In addition, it puts housing in close proximity with jobs and retail establishments, reducing the length of trips and further reducing reliance on single-occupancy vehicles. Therefore, this project conforms to the regional air quality plan and would be a less-than-significant impact. No mitigation is required.

The purpose of the 2009 CAP, which is currently under preparation, is to comply with California *Clean Air Act*, and in particular, to: reduce ozone precursor emissions; comply with transport mitigation requirements; reduce ambient concentrations of particulate matter; reduce ambient concentrations of TACs; and, reduce GHG emissions. The current draft control strategy has 57 control measures: 19 stationary source control measures; 10 mobile source control measures; 18 transportation control measures; 6 land use and local

impacts measures; four energy and climate measures; and 14 further study measures. Of particular import to the project are the transportation control measures and land use and local impacts measures.

The transportation control measures are grouped into five categories: improve transit services; improve system efficiency; encourage sustainable travel behavior; support focused growth and implement pricing strategies. The Project supports four out of these five categories. It improves transit services by adding and expanding certain transit routes. It improves the system efficiency and encourages sustainable travel behavior by locating residences near jobs, shopping and services. It supports focused growth by locating high-density residences near transit and services.

The proposed land use and local impacts measures are intended to promote focused growth to reduce the need for motor vehicle travel, and ensure that we plan for focused growth in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions. There are no significant stationary sources within 1,000 feet of the proposed residential development. The potential for exposure to mobile sources was evaluated in the air quality section and found to be less than significant. Finally, the project is an example of focused growth that reduces the need for vehicle travel.

Although the 2009 CAP is under development, and the control measures may evolve over time, the Project is consistent and supports the transportation control measures and land use and local impact measures currently considered for inclusion in the 2009 CAP.

Cumulative Impacts

Generally, the geographic context for the analysis of construction and operational air quality impacts is the SFBAAB, which is the basin considered and evaluated by the BAAQMD in its evaluation of air quality impacts. For certain issues, however, the geographic context is more limited to areas immediately surrounding the Project. This is true for construction dust and DPM emissions, $PM_{2.5}$ and CO associated with Project traffic and TACs from facilities in Project R&D areas; as opposed to regional issues such as the release of PM_{10} or ozone forming precursors (NO_X and ROG). Based on BAAQMD guidance as contained in BAAQMD CEQA Guidelines (*Assessing the Air Quality Impacts of Projects and Plans*),[208] any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

Construction

Construction emissions associated with new developments underway or at the planning stage in the area of the Project have the potential to combine with Project-related construction emissions to cause significant impacts. However, as discussed below, these impacts considered together are unlikely to cause significant impacts.

As shown in Figure III.A-1 (Proposed Developments in the Project Area), new proposed developments in the area of the Project are summarized below.

- Yosemite Slough Restoration Project: Re-vegetation, recreational and trails only; no structures
- Hunters View: 550 new homes

[208] Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, December 1999.

- India Basin Shoreline Area C: approximately 1,240 homes; 100,000 sq. ft. of retail; 1,365,000 sq. ft. of commercial space
- Hunters Point Shipyard Phase I (HPS Phase I): 1,600 homes
- Brisbane Baylands: 8,400,000 sq. ft. of development
- Executive Park: 2,800 homes; 90,000 sq. ft. of retail /restaurant
- Jamestown: - approximately 200 homes
- Visitacion Valley: 1,250 homes; 100,000 sq. ft. of retail
- Cow Palace Redevelopment: 1,700 homes; 550,000 sq. ft. of commercial/R&D

- When evaluating combined impacts, the relative location of the other proposed project to the Project is a critical factor to consider as local wind patterns affect the transport of pollutants from each location. As shown in Figure 1 of the HHRA Appendix V, the winds in the vicinity of the Project are predominantly from the west, blowing directly east. As such, only construction activities on other projects directly west of the Project are likely to combine with Project-related construction activities. As the Project is on the San Francisco Bay shoreline, there are no additional project immediately east. As shown in the map, the adjacent project with the most likely chance of causing a combined impact is the HPS Phase I development; however, infrastructure and grading is scheduled to be complete on that project by 2010 with full build-out in 2014 (depending on market conditions). Because the predominant wind direction is from the west to the east, the HPS Phase I project could impact the Project; however, the first occupancy of the HPS Phase II portion of the Project is not expected until 2016 or later, as such it is not expected that construction activities associated with HPS Phase I will cause adverse impacts on receptors in the HPS Phase II portion of the Project. The Project will not substantially impact HPS Phase I; the impacts of Project-related construction activities on HPS Phase I were explicitly evaluated in Impact AQ-2 and Impact AQ-3, as discussed above. Depending on the construction schedule for the Yosemite Slough Restoration Project, air quality impacts from construction equipment could combine with construction emissions of the Project. However, construction emissions from the Yosemite Slough Restoration Project would be predominantly blown east over the Bay and would not be anticipated to combine with construction emissions of the Project to cause a significant impact on sensitive receptors.

  The Jamestown project is located directly west of CP, however, due to its limited size and indeterminate timeline, it is not likely to combine with Project-related construction activities to cause a significant impact. Additionally, as discussed in the preceding mitigation measures, the Project applicant is committing to a number of mitigation measures to reduce impacts to a less-than-significant level, for example the stringent dust control measures outlined in mitigation measure MM AQ-1. As all other nearby projects are subject to BAAQMD requirements and most are subject to San Francisco requirements, they will also have to implement dust control measures which would keep combined construction impacts to less than significant.

  As stated under Impact AQ-1, fugitive dust associated with Project construction would not be expected to cause violations of AAQS with the inclusion of a City mandated and approved dust control plan. As stated under Impact AQ-2 and Impact AQ-3, emissions of DPM and soil-PM_{10} from construction activities associated with the Project would not exceed BAAQMD's thresholds for determining potential impacts to human health. With this plan in place, Project dust emissions would be controlled consistent with BAAQMD CEQA Guidelines and, therefore, construction fugitive dust emissions would be considered to

have a less-than-significant project impact. With Project emissions well controlled, the Project would not make a considerable contribution to a cumulative impact.

Operation

- Project operational emissions of the ozone precursors, ROG and NO_X, and of the criteria pollutants PM_{10} would exceed the BAAQMD project-specific significance thresholds. Therefore, as discussed earlier, these emissions would be considered to have a significant and unavoidable cumulative impact. However, these emissions are typically addressed though the BAAQMD Clean Air Plan so that Project emissions, in combination with all adjacent projects, will be addressed at a regional level.

  As discussed earlier, Project operational motor vehicle emissions of CO, including existing traffic volumes, would not cause violations of AAQS and the SFBAAB is expected to remain an Attainment area for CO. Additionally, as CO hotspots are a very localized impact and the CO analysis conducted includes cumulative traffic volumes, the cumulative CO impacts from the Project and any additional projects in the area will not cause a localized CO hotspot. Therefore, CO emissions would be considered to have a less-than-significant cumulative impact.

- Project stationary-source TACs, which could present human health risks to nearby receptors as a result of operation of the Project, would not exceed BAAQMD thresholds. Therefore, in accordance with BAAQMD guidelines, TAC emissions would be considered to have a less-than-significant cumulative impact.[209]

- No guidance is currently available for the assessment of $PM_{2.5}$ cumulative impacts from Project operations. $PM_{2.5}$ cumulative effects are assessed below based on the proposed BAAQMD CEQA guidelines.

Discussion of Proposed BAAQMD CEQA Guidelines

As discussed in the "Regional" section of Section III.H.3 (Regulatory Framework), as of the date of this Draft EIR the BAAQMD is in the process of revising their CEQA guidelines and expects the draft to be approved by their board of directors by the end of 2009. On October 7, 2009, the BAAQMD released a draft table of Staff-Recommended CEQA Thresholds of Significance which indicates a number of modifications to existing guidelines, including changes to the maximum daily emissions thresholds for criteria pollutants emissions from operational sources as well as requirements for the quantification of criteria pollutant and TAC emissions from construction activities and comparison to mass emission or risk thresholds, respectively. As these draft guidelines have not been adopted by the BAAQMD's Board of Directors, the Project is not subject to the draft requirements. However, the impacts of the Project with respect to the draft requirements, which differ from the current, approved requirements are described below.

Construction

Modifications from Existing Requirements

The proposed guidelines differ from the existing guidelines in two main areas:

1. Mass emission limits for ROG, NO_X, PM_{10} (exhaust) and $PM_{2.5}$ (exhaust) are proposed

[209] Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, December 1999.

2. A cancer risk of 10 in one million, non-cancer HI of 1.0, and a $PM_{2.5}$ concentration threshold of 0.3 $\mu g/m^3$ have been proposed

Impact Conclusion Based on Draft Guidelines

As stated above, the Project construction-related emissions would be less than significant with mitigation in accordance with the current BAAQMD CEQA Guidelines in effect at the time of this Draft EIR, which do not require quantification of construction-related emissions. However, in anticipation of the future implementation of proposed new BAAQMD CEQA quantitative thresholds of significance for construction-related emissions, this section provides a quantitative analysis of the Project's construction emissions to determine whether they would exceed the proposed thresholds. Worst-case, construction related emissions of criteria air pollutants and precursors were modeled in accordance with BAAQMD-recommended methodologies. Emissions of criteria air pollutants and precursors were modeled based on Project specifications (e.g., amount and type of equipment) described previously and default and BAAQMD-recommended settings and parameters attributable to the activity period and site location.

Table III.H-7 (Construction Criteria Pollutant Emissions) summarizes the modeled Project-generated, construction-related emissions of each criteria air pollutant and precursor. As shown in the table, construction-related emissions of ROG and NO_X would have potentially significant and unavoidable impacts on air quality in accordance with the proposed BAAQMD thresholds of significance.

Table III.H-7 Construction Criteria Pollutant Emissions

Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*Exhaust PM_{10} (lbs/day)*	*Exhaust $PM_{2.5}$ (lbs/day)***
Candlestick Point*	527 (2019)	453 (2106)	2.8 (2016)	2.6 (2016)
HPS Phase II*	639 (2016)	1,036 (2016)	8.5 (2016)	7.8 (2016)
Project*	724 (2106)	1,490 (2016)	11.2 (2016)	10.3 (2016)
Proposed BAAQMD Significance Threshold*	54	54	82	54
Project Exceeds Proposed BAAQMD Threshold?	Yes	Yes	No	No

SOURCE: ENVIRON, 2009. Based on URBEMIS 2007 Version 9.2.4.

* Values in parentheses represent year of construction when maximum daily emissions occur.

** Per URBEMIS 2007, exhaust $PM_{2.5}$ is calculated as 92% of exhaust PM_{10}.

As discussed in Impact AQ-2 and Impact AQ-3, the estimated cancer risk and noncancer HIs associated with Project-related construction activities are below the current and proposed significance thresholds. As such, Impact AQ-2 and Impact AQ-3 would be less than significant with mitigation. While a detailed evaluation has not been separately documented, the analysis conducted to evaluated risks and hazards from construction exhaust can be used to evaluate the proposed $PM_{2.5}$ standard of 0.3 $\mu g/m^3$. At no off-site location did the estimated concentration of DPM exceed this threshold; therefore, construction activity associated with the Project would be less than significant when judged against this proposed standard.

Operational

Modifications from Existing Requirements

The proposed guidelines differ from the existing guidelines in two main areas:

1. Mass emission limits for ROG, NOx, PM_{10} (exhaust) are changed and a mass emission rate is proposed for $PM_{2.5}$ (exhaust) and fugitive dust
2. A $PM_{2.5}$ concentration threshold of 0.3 $\mu g/m^3$ has been proposed

Impact Conclusion Based on Draft Guidelines

The proposed mass emission limits for ROG, NOx, PM_{10} (exhaust), and $PM_{2.5}$ (exhaust) are shown in parentheses next to the existing mass emission limits and in Table III.H-8 (Operational Criteria Pollutant Emissions [Year 2030]). As shown in the table, the criteria pollutant emissions from mobile and area sources would continue to be above the proposed significance thresholds, Impact AQ-1 would remain significant and unavoidable.

Table III.H-8 Operational Criteria Pollutant Emissions (Year 2030)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Candlestick Point					
Area*	449	70	53	4	4
Motor Vehicles (External)	217	195	2,224	1,026	193
Subtotal	***666***	***265***	***2,276***	***1,029***	***197***
HPS Phase II					
Area*	166	38	30	1	1
Motor Vehicles (External)	88	80	916	423	80
Subtotal	***255***	***119***	***947***	***424***	***81***
Project					
Area*	616	108	83	5	5
Motor Vehicles (External)	305	275	3,140	1,449	273
Motor Vehicles (Internal)	24	11	184	36	7
All Sources (Project)	***945***	***394***	***3,406***	***1,490***	***285***
Proposed BAAQMD Significance Threshold**	54	54	None	82	54
Project Exceeds Proposed BAAQMD Threshold?	Yes	Yes	—	Yes	Yes

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_X were calculated under summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and PM $_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest. http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Pollutants.aspx

* Area emissions are from sources located on the Project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

** Represent mass daily emissions thresholds reflected in draft Staff-Recommended CEQA Thresholds of Significance table released by the BAAQMD on October 7, 2009.

— BAAQMD significance threshold for CO is based on air concentration and not mass emission rates.

As shown in the "Impact AQ-7: Traffic $PM_{2.5}$" discussion above, $PM_{2.5}$ concentrations associated with Project-related traffic at 2030, would be below the SFDPH standard of 0.2 $\mu g/m^3$. As the proposed

BAAQMD standard is 0.3 $\mu g/m^3$, the traffic-related operational emissions would meet the proposed BAAQMD standard. As such, Impact AQ-4 would be less than significant.

Cumulative

Modifications from Existing Requirements

The proposed guidelines differ from the existing guidelines in proposing to add a zone of influence analysis for any operational or construction source within 1,000-foot radius of the Project fenceline, such that the combined impacts cannot exceed any of the following:

- Cancer risk of 100 in one million
- Non-cancer HI of 1.0
- $PM_{2.5}$ concentration threshold of 0.8 $\mu g/m^3$ have been proposed

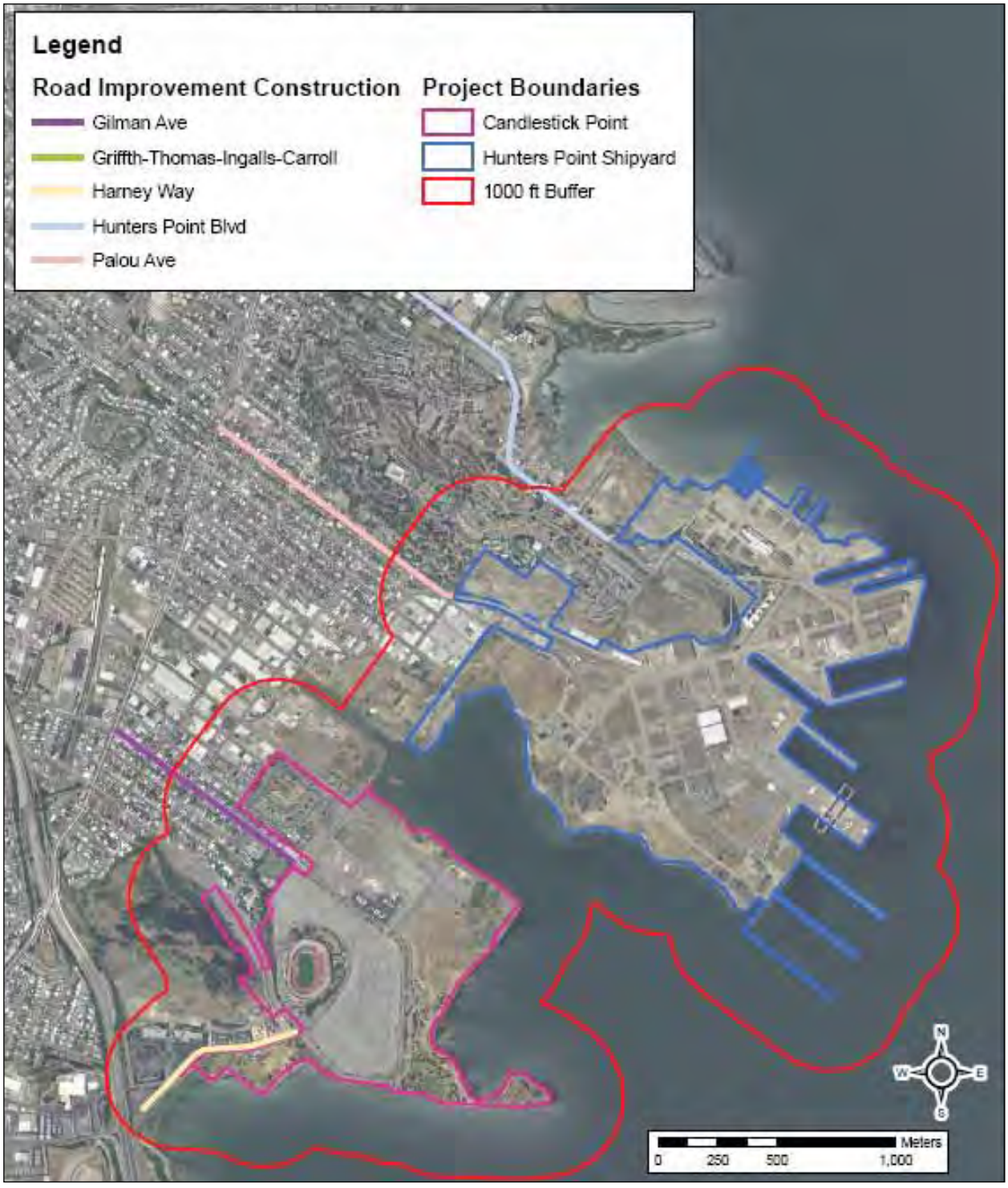
Impact Conclusion Based on Draft Guidelines

As shown in Figure III.H-1 (1,000-Foot Buffer Surrounding Project Fenceline), there are few, if any, additional large emission sources within 1,000 feet of the Project fenceline. The only potential exceptions are:

- Operational emissions associated with traffic on US-101 to the southwest of CP, which is greater than 500 feet from the Project fenceline and only within 1,000 feet of the shoreline park section of the Project
- Construction emissions from development of other project in the vicinity, as discussed above

As shown previously, Impact AQ-3, Impact AQ-4, Impact AQ-7, and Impact AQ-8 indicate that operational and construction emissions associated with the Project are less than significant. As there are no additional major sources of emissions sources within 1,000 feet of the Project fenceline, it is unlikely that the cumulative impacts would exceed the proposed standards. The impact of US-101 has not been directly evaluated; however, that section of freeway is only within 1,000 feet of the portion of the Project designated as a shoreline park where no residents would locate. As such, based on the proposed BAAQMD CEQA Guidelines, the freeway would not adversely affect residents at the Project. Therefore the cumulative impacts would likely be less than significant for the proposed thresholds.

However, the area adjacent to the Project zoned commercial where small-scale TAC or $PM_{2.5}$ emissions sources, such as automotive repair or refinishing, dry cleaning, or artist shops. As the identity of these sources is not known, if they exist at all, it is impossible to determine what cumulative impacts may be though there is the potential for these cumulative impacts to exceed the proposed BAAQMD CEQA thresholds. At workshops discussing the proposed CEQA guidelines, the BAAQMD indicated that a District-wide database of TAC/$PM_{2.5}$ sources would be released at some point in the future to support this effort. However, at this time, it is not possible to accurately predict the potential cumulative risks in the Project vicinity. Nonetheless, given the potential for these cumulative impacts to exceed the proposed BAAQMD CEQA thresholds, it is possible that the Project would contribute considerably to a cumulative impact from such sources and, therefore, may result in a significant cumulative air quality impact to sources of TAC emissions. If such an impact exists, this impact would be considered significant and unavoidable at this time, given the inability to determine the nature of such an impact accurately and, therefore, to determine whether any mitigation measures would be effective to reduce the impact to a less than significant level.



SOURCE: ENVIRON, 2009.

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FIGURE III.H-1 Candlestick Point — Hunters Point Shipyard Phase II EIR

1,000-FOOT BUFFER SURROUNDING PROJECT FENCELINE

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SECTION III.I NOISE AND VIBRATION

III.I.1 Introduction

This section of the EIR discusses existing and future sources of noise and vibration on and around the Project site and examines the potential for (1) exposure of persons to or generation of noise levels in excess of standards established in the Environmental Protection Element of the *San Francisco General Plan* or San Francisco Noise Ordinance (Article 29, *San Francisco Police Code*); (2) exposure of persons to or generation of excessive groundborne vibration levels; (3) a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project; (4) a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project; (5) exposure of persons to excessive aircraft noise levels; or (6) substantial impacts from existing noise sources. The impact analysis identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts.

Data used to prepare this analysis were obtained from the *San Francisco General Plan* (General Plan) *Environmental Protection Element*; the *Bayview DEIR San Francisco 49ers Stadium Operational Noise Study*, prepared by Wilson, Ihrig & Associates (included as Appendix I1); the Federal Transit Administration's *Transit Noise and Vibration and Impact Assessment* methodology; and by measuring and modeling existing and future noise levels within the Project site and at surrounding land uses. Traffic information contained in the *Traffic Impact Analysis*, prepared by the LCW Consulting, Fehr & Peers Associates, and CHS Consulting Group, was used to prepare the noise modeling for vehicular sources. All construction activity estimates were based on the September 2009 and March 2010 MACTEC Engineering Construction Phasing Plan.

Acoustic Terminology and Definitions

Sound is created when vibrating objects produce pressure variations that move rapidly outward into the surrounding air. The main characteristics of these air pressure waves are amplitude, which we experience as a sound's loudness, and frequency, which we experience as a sound's pitch. The standard unit of sound amplitude is the decibel (dB); it is a measure of the physical magnitude of the pressure variations relative to the human threshold of perception. The human ear's sensitivity to sound amplitude is frequency-dependent; it is more sensitive to sounds in the mid-frequency range than to sounds with much lower or higher frequencies.

Most "real world" sounds (e.g., a dog barking, a car passing, etc.) are complex mixtures of many different frequency components each having different amplitudes. When the average amplitude of such sounds is measured with a sound level meter, it is common for the instrument to apply adjustment factors to each of the measured sound's frequency components. These factors account for the differences in perceived loudness of each of the sound's frequency components relative to those to which the human ear is most sensitive. Because the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The unit of A-weighted sound amplitude is also the decibel. In reporting measurements to which A-weighting has been applied, an "A" is appended to dB (dBA) to

make this clear. In some cases, however, it is useful to know the actual average sound amplitude without application of the A-weighting factors; this type of averaging is called C-weighting and its result is reported in C-weighted decibels (dBC). Finally, since environmental sound levels usually vary greatly over time, it is often useful to know the degree of variability at a particular location over any measurement period. This variability is specified in terms of statistical sound levels (L_n), where n is the percentage of time these levels are exceeded during the measurement period. For example, L_{10}, L_{50}, and L_{90} are descriptors that represent the sound level exceeded 10 percent of the time, 50 percent of the time, and 90 percent of the time, respectively, during a measurement, while L_{min} and L_{max} represent the minimum and maximum sound levels during the measurement period.

Noise is the term generally given to the intrusive, "unwanted" aspects of sound. Many factors influence how a sound is perceived and whether it is considered harmful or disruptive to an individual or a community. These factors include the primary physical characteristics of a sound (e.g., amplitude, frequency, duration, etc.), but also secondary acoustic and non-acoustic factors (that can influence judgment regarding the degree to which it is intrusive and disruptive. Table III.I-1 (Representative Environmental Noise Levels) lists representative noise levels for the environment.

All quantitative descriptors used to measure environmental noise exposure recognize the strong correlation between the high acoustical energy content of a sound (i.e., its loudness and duration) and the disruptive effect it is likely to have as noise. Because environmental noise fluctuates over time, most such descriptors average the sound level over the time of exposure, and some add "penalties" during the times of day when intrusive sounds would be more disruptive to listeners. The rating scales of L_{eq}, L_{min}, and L_{max} are measures of ambient noise, while the L_{dn} and Community Noise Equivalent Level (CNEL) are measures of community noise. L_{eq} is the average A-weighted sound level measured over a given time interval. L_{eq} can be measured over any time period, but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods. L_{dn} is another average A-weighted sound level measured over a 24-hour time period. However, this noise scale is adjusted to account for some individuals' increased sensitivity to noise levels during the evening and nighttime hours. L_{eq}, L_{min}, and L_{max}, as well as L_{dn} and CNEL are all applicable to this analysis and defined as follows:

The most commonly used noise descriptors for environmental exposures are:

- **L_{eq}**, the equivalent-energy noise level, is the average acoustic energy[210] content of noise over any chosen exposure time. The L_{eq} is the constant noise level that would deliver the same acoustic energy to the ear as the actual time-varying noise over the same exposure time. L_{eq} does not depend on the time of day during which the noise occurs.
- **L_{dn}**, the day-night average noise level, is a 24-hour average L_{eq} with a 10 dBA "penalty" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for increased nighttime noise sensitivity. Because of this penalty, the L_{dn} would always be higher than its corresponding 24-hour L_{eq} (e.g., a constant 60 dBA noise over 24 hours would have a 60 dB L_{eq}, but a 66.4 dBA L_{dn}).

[210] Averaging sound levels in decibels is not done by standard arithmetic averaging, but according to the following rule:
$L_{eq} = 10 \times \log((1/n) \times (10^{L1/10} + 10^{L2/10} + \ldots + 10^{Ln/10})$; where L_1, L_2, L_n are n individual sound levels.
For example, the L_{eq} of the sound levels $L_1 = 60$ dBA and $L_2 = 70$ dBA is 67.4 dBA, not 65 dBA as it would if standard arithmetic averaging were used. The larger individual sound levels contribute much more substantially to the L_{eq} than they would to an average done in the standard way.

Table III.I-1 Representative Environmental Noise Levels

Common Outdoor Activities	*Noise Level (dBA)*	*Common Indoor Activities*
	—110—	Rock Band
Jet Fly-over at 100 feet	—105—	
	—100—	
Gas Lawnmower at 3 feet	—95—	
	—90—	
	—85—	Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime	—75—	
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Commercial Area	—65—	Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	
	—55—	Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
	—45—	
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime	—35—	
	—30—	Library
Quiet Rural Area during Nighttime	—25—	Bedroom at Night, Concert Hall (background)
	—20—	
	—15—	Broadcast/Recording Studio
	—10—	
	—5—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

SOURCE: California Department of Transportation 1998

- **CNEL**, the Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 P.M. to 10:00 P.M. and a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA-24 hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
- **SEL**, the sound exposure level (also known as the single noise event level), is the constant noise level that would deliver the same acoustic energy to the ear of a listener during a one-second exposure as the actual time-varying noise would deliver over its entire time of occurrence.[211] SEL is typically used to characterize the effects of short-duration noise events (e.g., aircraft fly-overs or train pass-bys)

[211] For a sound lasting longer than one second, its SEL would be higher than that of the largest of the shorter-duration component sounds that make up the total. For example, if a sound with a ten-second-long duration made up of 10 one-second-long component sounds, each of 60 dBA amplitude, its SEL would be 70 dBA.

Noise levels from a particular source decline as distance to the receptor increases. Other factors, such as the weather and other reflecting or shielding factors, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., where the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., where the area between the source and receptor is unpacked earth or has vegetation, including grass). Noise from stationary or point sources (such as commercial heating and ventilation units [HVAC] or construction equipment) is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Generally, if a noise source is completely enclosed or completely shielded with a solid barrier located close to the source, an 8 dBA noise reduction can be expected; if the enclosure and/or barrier it is interrupted, noise would be reduced by only 5 dBA. The exterior-to-interior reduction of newer residential units and office buildings is generally 30 dBA or more.

Fundamentals of Environmental Ground-borne Vibration

Vibrating objects in contact with the ground radiate energy through the ground. If the object is massive enough and/or close enough to an observer, the ground vibrations are perceptible. Vibration magnitude is measured in vibration decibels (VdB) relative to a 1 micro-inch-per-second reference level. Background vibration levels in most inhabited areas are usually 50 VdB or lower, well below the threshold of perception (i.e., typically about 65 VdB). In most cases, when vibration is perceptible to people in their homes or workplaces, the source is within the same building (i.e., operation of HVAC equipment, movement of other occupants, slamming of doors, etc.). The outdoor sources most commonly responsible for producing perceptible vibration are heavy construction equipment, steel-wheeled trains, and motor vehicle traffic on rough roads (if the roadway is smooth, the vibration from traffic is rarely perceptible). At about 100 VdB, vibration levels are strong enough to begin to cause structural damage in fragile buildings.

Health and Welfare Effects of Environmental Noise

World Health Organization Noise Exposure Recommendations

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding health impacts of noise. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA or when intermittent interior noise levels reach 45 dBA, particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria would suggest exterior continuous (ambient) nighttime noise levels should be 45 dBA or below, and short-term events should not generate noise in excess of 60 dBA. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability to fall asleep.[212]

Other potential health effects of noise identified by WHO include decreased performance on complex cognitive tasks, such as reading, attention, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise

[212] World Health Organization, *Guidelines for Community Noise.* Geneva, 1999. http://www.who.int/docstore/peh/noise/guidelines2.html.

levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high noise levels, for example, exposure several times a year to concert noise at 100 dBA). Noise can also disrupt speech intelligibility at relatively low levels; for example, in a classroom setting, a noise level as low as 35 dBA can disrupt clear understanding. Finally, noise can cause annoyance, and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA, or moderately annoyed with noise levels below 50 dBA.

According to WHO, an adverse effect of noise is defined as:

> … a change in the morphology and physiology of an organism that results in impairment of functional capacity, or an impairment of capacity to compensate for additional stress, or increases the susceptibility of an organism to the harmful effects of other environmental influences … [including] any temporary or long-term lowering of the physical, psychological or social functioning of humans or human organs.

WHO exposure recommendations to avoid the adverse effects described below is summarized in Table III.I-2 (WHO Guideline Values for Community Noise in Specific Environments).

Table III.I-2 WHO Guideline Values for Community Noise in Specific Environments

Specific Environment	*Critical Health Effect(s)*	L_{eq} *(dBA)*	*Exposure Time (hours)*	L_{max} *(dB)*
Outdoor residential area	Serious annoyance, daytime and evening	55	16	—
	Moderate annoyance, daytime and evening	50	16	—
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime and evening	35	16	
Inside bedrooms	Sleep disturbance, nighttime	30	8	45
School class rooms, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	—
School playground outdoor	Annoyance (external source)	55	during play	—
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Outdoors in parks and nature preserves[a]	Disruption of tranquility	*		

SOURCE: WHO Guidelines for Community Noise - A complete, authoritative guide on the effects of noise pollution on health, Table 4.1.

a. Existing quiet outdoor areas should be preserved, and the ratio of intruding noise to natural background sound should be kept low.

The San Francisco Noise Ordinance (Section 2900) makes the following declaration with regard to community noise levels and the WHO Guidelines (additional provisions of the San Francisco Noise Ordinance that pertain to the Project are given below in Regulatory Framework):

> It shall be the policy of San Francisco to maintain noise levels in areas with existing healthful and acceptable levels of noise and to reduce noise levels, through all practicable means, in those areas of San Francisco where noise levels are above acceptable levels as defined by the World Health Organization's Guidelines on Community Noise.

III.I.2 Setting

Existing Noise Levels and Noise-Sensitive Uses in the Project Vicinity

The Project site consists of two distinct geographic areas: Candlestick Point, which primarily contains the existing San Francisco 49ers stadium, the Candlestick Point State Recreation Area (CPSRA), a recreational vehicle park, and the Alice Griffith Public Housing; and HPS Phase II, which contains many structures associated with ship repair, storage, and former Navy uses, most of which are vacant, as well as 300 artists located in studios on Parcels A and B.

The Project site is located in the southeastern area of San Francisco and extends east to San Francisco Bay (refer to Figure II-1 [Project Location]). This promontory is bounded on the south and west by the Bayview Hunters Point neighborhood and on the north and east by San Francisco Bay. The ground surface across the entire Project site is relatively flat with elevations ranging from approximately 0 feet to +20 feet (San Francisco City Datum [SFCD]).[213] Maximum ground surface elevation near the Project site is on Bayview Hill (west of Candlestick Point), which reaches an elevation of approximately 400 feet SFCD. To the north of HPS Phase II, there is a bluff that forms the end of a ridge (Hunters Point Hill) extending to the northwest almost to Third Street. The bluff is currently being developed with residential uses by Lennar Urban (HPS Phase I). The ridge serves to shield a portion of an existing residential neighborhood further north from any existing or future noise sources on HPS Phase II. To the northwest of HPS Phase II, the land is generally flat and largely residential, while west of Candlestick Point, an existing residential neighborhood is elevated above that site's flat terrain.

There are also existing light industry and warehouse land uses to the west and northwest of the Project site (in the vicinity of and north of Carroll Avenue), but these uses are not generally considered to be noise sensitive.

Noise-Sensitive Uses

The City and County of San Francisco has defined noise-sensitive uses as land uses and/or receptors of residences of all types, schools, hospitals, convalescent facilities, rest homes, hotels, motels, and places of worship. Sensitive uses from a noise perspective include places where there is a reasonable expectation that individuals could be sleeping, learning, worshipping, or recuperating. Existing noise-sensitive uses in the vicinity of the Project site include residential areas of Bayview Hunters Point, and Hunters Point Phase I residential uses. Schools in the vicinity of the Project site include Bret Harte Elementary School, Bret Harte Nursery and School-Age Children's Center, Kipp Bayview Academy, S.R. Martin College Preparatory School, Muhammad University of Islam, Malcom X Academy Elementary School, and Dr. George Washington Carver Elementary School. Additionally, residential uses developed within the Project site that would be occupied during subsequent construction phases would be considered noise-sensitive uses for the purposes of this EIR.

[213] San Francisco City Datum (SFCD) is a local vertical geodetic reference system specific to the City and County of San Francisco and formally established in 1964 as 8.616 feet above the National Geodetic Vertical Datum of 1929 (NGVD29), making it about 8.13 feet above mean sea level. The North American Vertical Datum (NAVD88) generally has replaced NGVD29 as a standard reference. Elevations expressed in NGVD29 may be converted to NAVD88 by adding 2.69 feet.

Community Ambient Noise Levels

Long-term 24-hour ambient noise measurements were taken at six locations in the residential neighborhoods north and west of the Project site for a total of six days in 2009. The long-term ambient noise measurements were conducted over the course of three days in January 2009 first by recording A-weighted community noise levels. In July 2009, the C-weighted community noise levels were measured at the same locations over the course of three days. Both the A-weighted and C-weighted measurements were for three consecutive 24-hour periods at each location during the respective measurement times and were recorded using Larson Davis digital sound level meters that satisfy the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. The Saturday-Sunday-Monday period was chosen for the three-day measurements because those are the days when a football game would most likely to be played at the proposed Stadium and concerts are also most likely to occur there during a weekend. To obtain the measurements, the microphone was positioned at a height of 12 ft feet above the ground. The locations of these measurements are indicated as N1 through N6 on the aerial photo in Figure III.I-1 (Long-Term Ambient Noise Measurement Locations).

Table III.I-3 (Existing Day-Night Noise Levels [L_{dn}]) contains a summary of the L_{dn} measurements by location for each 24-hour period of the survey. Hourly data were recorded for L_{eq} and Ln descriptors (the latter being the levels exceeded n% of the time, where n=90, 50, 10, and 1). The existing ambient noise measurement data indicate variable conditions, with some areas quieter than others. From Table III.I-3 it can be seen that the measured L_{dn} ranges from 58 dBA to 67 dBA, with the highest level measured at N1 (likely due to a higher level of truck traffic there than at the other locations). Weekend noise levels were lower (by 1 to 4 dBA) on Sunday than on Saturday, while Monday noise levels were generally similar to those on Saturday. With most L_{dn} values (i.e., except those at N3 and N6) near or greater than 65 dBA L_{dn}, the ambient noise levels in the study area are generally higher than in San Francisco's western residential neighborhoods (i.e., Richmond or Sunset Districts), but lower than those in Downtown or South of Market Areas.[214] It was observed that N3 and N6 had less traffic than the other locations measured, which would explain why these locations are quieter than the others.

Table III.I-4 (Existing A-Weighted Background Noise Levels [L_{90}]) contains a summary of the range of existing A-weighted ambient background (L_{90}) levels, at times when a football game would usually occur (i.e., weekend afternoons, 3:00 P.M. to 6:00 P.M., and Monday evenings, 6:00 P.M. to 9:00 P.M.).

Table III.I-5 (Existing C-Weighted Background Noise Levels [L_{90}] at Night) contains a similar summary of the C-weighted background levels at night, the time a concert at the proposed stadium would likely occur (7:00 P.M. to midnight).

[214] *Spatial distribution of traffic induced noise exposures in a US city: an analytic tool for assessing the health impacts of urban planning decisions*, WYW Seto et al, International Journal of Health Geographics, 2007, 6:24.

SOURCE: PBS&J, 2009.

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FIGURE III.I-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

LONG-TERM AMBIENT NOISE MEASUREMENT LOCATIONS

Table III.I-3 Existing Day-Night Noise Levels (L_{dn})

Location ID	*Measurement Location Description*	*Saturday 10 Jan 2009*	*Sunday 11 Jan 2009*	*Monday 12 Jan 2009*
N1	Residential area along Carroll Avenue north of Arelious Walker Drive	67	63	67
N2	Residential area along Revere Avenue between Ingalls Street and Jennings Street	64	63	65
N3	Residential area along Donahue Street between Kirkwood Avenue and Jerrold Avenue	62	58	59
N4	Residential area along Kiska Road between Reardon Road and Ingalls Street	65	65	66
N5	Residential area along Hawes Street near Hunters Point Boulevard	65	62	64
N6	Residential area along Jamestown Avenue at Hawes Street	60	59	60

SOURCE: Wilson, Ihrig & Associates, 2009

Measurements include the effects of all noise sources influential at or near each location during each designated measurement period; traffic noise is likely the dominant influence at all locations and during all periods, but other sources (e.g., aircraft, trash pickup, etc.) also contribute to the totals.

Table III.I-4 Existing A-Weighted Background Noise Levels (L_{90})

Location ID	*Measurement Location Description*	*Saturday 10 Jan 2009*	*Sunday 11 Jan 2009*	*Monday 12 Jan 2009*
N1	Residential area along Carroll Avenue north of Arelious Walker Drive	45 to 46	45 to 49	43 to 47
N2	Residential area along Revere Avenue between Ingalls Street and Jennings Street	48 to 49	47 to 50	45 to 49
N3	Residential area along Donahue Street between Kirkwood Avenue and Jerrold Avenue	42 to 45	43 to 45	41 to 43
N4	Residential area along Kiska Road between Reardon Road and Ingalls Street	45 to 48	42 to 43	44 to 45
N5	Residential area along Hawes Street near Hunters Point Boulevard	47 to 50	44 to 46	43 to 48
N6	Residential area along Jamestown Avenue at Hawes Street	47 to 50	49 to 50	46 to 48

SOURCE: Wilson, Ihrig & Associates, 2009

Measurements include the effects of all noise sources influential at or near each location during each designated measurement period; traffic noise is likely the dominant influence at all locations and during all periods, but other sources (e.g., aircraft, trash pickup, etc.) also contribute to the totals.

Table III.I-5 Existing C-Weighted Background Noise Levels (L_{90}) at Night

Location ID	*Description*	*Range*	*Median*
N1	Residential area along Carroll Avenue north of Arelious Walker Drive	58 to 63	60
N2	Residential area along Revere Avenue between Ingalls Street and Jennings Street	55 to 62	58
N3	Residential area along Donahue Street between Kirkwood Avenue and Jerrold Avenue	53 to 60	56
N4	Residential area along Kiska Road between Reardon Road and Ingalls Street	55 to 64	59
N5	Residential area along Hawes Street near Hunters Point Boulevard	56 to 64	60
N6	Residential area along Jamestown Avenue at Hawes Street	—	—

SOURCE: Wilson, Ihrig & Associates, 2009

Measurements include the effects of all noise sources influential at or near each location during each designated measurement period; traffic noise is likely the dominant influence at all locations and during all periods, but other sources (e.g., aircraft, trash pickup, etc.) also contribute to the totals.

Traffic Noise Levels along Major Project Site Access Routes

Short-term traffic noise measurements (i.e., 15 minutes each) were taken at five near-curbside locations along the main Project site access routes during the weekday PM peak commute period, as shown in Table III.I-6 (Existing Peak-Hour Traffic Noise Measurements). The locations of these measurements are indicated as T1 through T5 on the aerial photo in Figure III.I-2 (Short-Term Ambient Noise Measurement Locations).

Table III.I-6 Existing Peak-Hour Traffic Noise Measurements (L_{eq})

Noise Receptor	*Land Use Description*	*Noise Level* L_{eq}	L_{min}	L_{max}	*Primary Noise Source*
T1	Candlestick Condos	66.8	60.5	87.3	Traffic along Candlestick, and US-101
T2	Residences along Hunters Point Boulevard	67.8	47.1	86.3	Traffic along Hunters Point Boulevard
T3	Residences along Palou Avenue between Jennings and Ingalls	65.8	51.6	86.4	Traffic along Palou Avenue
T4	Vacant lot along Carroll Avenue across from Alice Griffith Neighborhood Park residences.	64.8	46.9	88.0	Traffic along Carroll Avenue
T5	Residences along Gilman Avenue, across from Bret Hart Elementary School	61.4	52.4	78.9	Traffic along Gilman Avenue

SOURCE: PBS&J, 2009.
Noise measurements taken on May 20, 2009, between the hours of 3:00 P.M. and 6:00 P.M. for 15 minutes each.
Noise measurement data sheets are available in Appendix I2 (Short-Term Noise Measurements).

In addition to short-term measurements, traffic noise L_{eq} (peak hour) and L_{dn} at the setbacks of the residential uses adjacent to the major access routes (and other streets likely to carry substantial Project traffic volumes) were calculated using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, truck mix, distance from roadway to receptor and site environmental conditions. The average vehicle noise rates (energy rates) utilized in TNM replicate the latest measurements of average vehicle noise rates for all vehicle classes. Traffic volumes utilized as data inputs in the noise prediction model were provided through the traffic analysis prepared for this EIR.[215] The *San Francisco General Plan* regards noise levels less than or equal to 60 dBA L_{dn} as "satisfactory, with no special noise insulation requirements" for residential uses (refer to Section III.I.3 [Regulatory Framework]). The average daily noise levels along these roadway segments are presented in Table III.I-7. As shown, all roadways modeled were below the 60 dBA L_{dn} noise level, except for 3rd Street and Bayshore Boulevard.

[215] United States Department of Transportation. Federal Highway Administration. FHWA Traffic Noise Model® User's Guide (Version 2.5 Addendum) April 2005.

SOURCE: PBS&J, 2009.

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FIGURE III.I-2 Candlestick Point — Hunters Point Shipyard Phase II EIR

SHORT-TERM AMBIENT NOISE MEASUREMENT LOCATIONS

Table III.I-7 Modeled Existing Traffic Noise Levels at Residential Setbacks

Roadway	*Land Use*	*Setback Distance (feet from centerline)*	L_{dn}
Innes north of Carroll Avenue	Residential	30	53.3
3rd south of Carroll Avenue	Residential	40	**62.8**
Caesar west of 3rd Street	Residential	60	59.
Palou Avenue east of 3rd Street	Residential	40	56.8
Ingalls north of Carroll Avenue	Residential	30	56.7
Carroll Avenue east of 3rd Street	Residential	60	52.6
Gilman Avenue east of 3rd Street	Commercial	40	57.7
Jamestown Avenue north of Harney Way	Residential	60	51.4
Harney Way west of Jamestown Avenue	Residential	80	52.6
Bayshore Boulevard north of Visitacion	Residential	40	**65.1**

SOURCE: PBS&J 2009
Noise model data sheets are available in Appendix I3 (Traffic Noise Model Output).

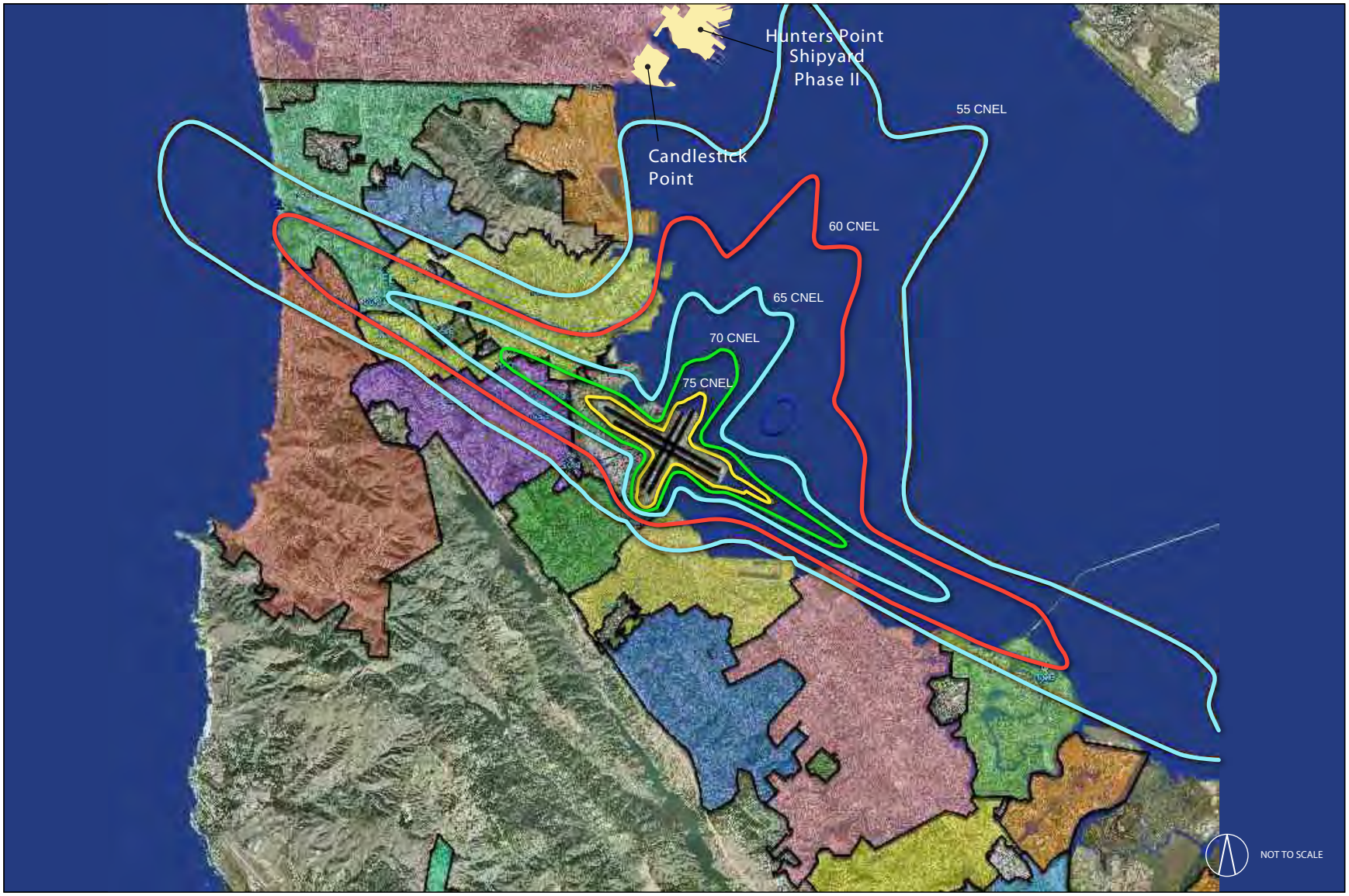
Existing Aircraft Noise Levels on the Project Site

San Francisco International Airport (SFO) is located approximately 10 miles to the south of the Project site. Commercial aircraft associated with SFO operations regularly fly-over the Project site. However, as shown in Figure III.I-3 (SFO Noise Contour Map), the Project site is well outside SFO's 65 dBA CNEL noise contour (and is even outside the 55 dBA CNEL contour). Additionally, SFO issues monthly July 2009 *Airport Director's Reports*, which document the frequency of aircraft noise standard violations and the number/locations of noise complaints received. A review of *Airport Director's Reports* from the past 6 months indicates that no complaints were received from BVHP neighborhood residents regarding aircraft noise.[216]

Football Game Noise Levels Measured Near the Existing 49er Stadium

Noise measurements were taken near the existing Candlestick Park stadium (outside the Jamestown Condominiums on the west side of Jamestown Avenue) during a football game (49ers vs. Tampa Bay, Sunday December 23, 2007). As shown in Figure III.I-4 (Monster Park Sound Levels [49ers vs. Tampa Bay on December 23, 2007] at Jamestown Condominiums), the noise level in the vicinity of a stadium with a football game in progress is highly variable. Most of the peak noise events were associated with game activities (e.g., pre-game ceremonies, crowd cheering, music, and announcements on the public address system, etc.). The highest game-related peak noise (L_{max}) was in the upper 60s to mid 70s dBA, but more often lower; audible game-related noise events were fairly frequent but of short duration. The average noise level (L_{eq}) during the portion of the game monitored was in the mid 60s dBA, while the background level (L_{90}) was in the upper 50s dBA. Also, game activity was not the only source of peak noise events. Candlestick Park is under major approach/departure routes to/from SFO. Aircraft overflights happened a few times during the monitoring period and though their L_{max} were not as large as that of the highest game noise events, their audible duration was longer, pushing their SEL level into the low to mid 70s dBA.

[216] SFO Aircraft Noise Abatement Office, *July 2009 Airport Directors Report.* http://www.flyquietsfo.com/reports/monthlyDirectors/0907%20report%20with%20cover.pdf. Accessed September 24, 2009.



SOURCE: 65 CNEL noise contour, http://tx-sfo.airportnetwork.com/#.

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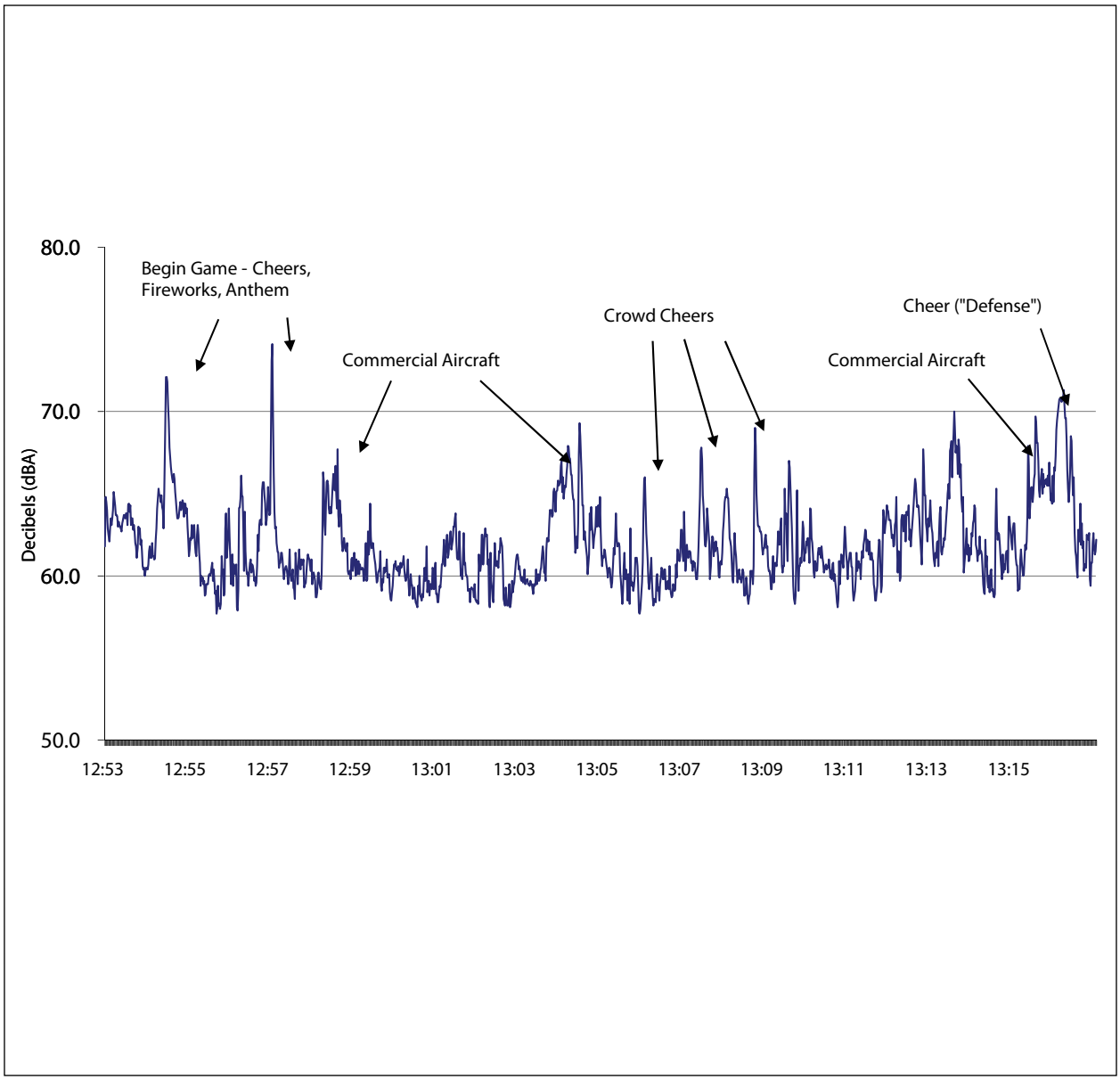
FIGURE III.I-3

Candlestick Point — Hunters Point Shipyard Phase II EIR

SFO NOISE CONTOUR MAP



SOURCE: PBS&J, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.I-4

MONSTER PARK SOUND LEVELS (49ers vs Tampa Bay Dec. 23, 2007) AT JAMESTOWN CONDOMINIUMS

III.I.3 Regulatory Framework

Federal

US Environmental Protection Agency

The federal *Noise Control Act of 1972* addressed the issue of noise as a threat to human health and welfare, particularly in urban areas. In response to the Act, the US Environmental Protection Agency (USEPA) published *Information of Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (USEPA Levels). Table III.I-8 (Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety) summarizes EPA recommendations for noise-sensitive areas. Ideally, the yearly average L_{eq} should not exceed 70 dBA to prevent measurable hearing loss over a lifetime, and the L_{dn} should not exceed 55 dBA outdoors and 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas. In addition to the identified noise levels to protect public health, the USEPA Levels identifies an increase of 5 dBA as an adequate margin of safety relative to a baseline noise exposure level of 55 dBA L_{dn} before a noticeable increase in adverse community reaction would be expected.

Table III.I-8 Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety

Effect	*Level*	*Area*
Hearing Loss	L_{eq}(24 hr) < 70 dBA[a]	All areas.
Outdoor activity interference and annoyance	L_{dn} < 55 dBA	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
Outdoor activity interference and annoyance	L_{eq}(24 hr) < 55 dBA	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	L_{dn} < 45 dBA	Indoor residential areas.
Indoor activity interference and annoyance	L_{eq}(24 hr) < 45 dBA	Other indoor areas with human activities such as schools, etc.

SOURCE: US Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974.

a. Yearly average equivalent sound levels in decibels; the exposure period that results in hearing loss at the identified level is a period of forty years.

The EPA does not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no reason to suspect that there would be risk from any of the identified health or welfare effects of noise.

Federal Transit Administration

The Federal Transit Administration (FTA) developed a methodology and significance criteria to evaluate noise impacts from surface transportation modes (i.e., passenger cars, trucks, buses, and rail) in *Transit Noise Impact and Vibration Assessment* (FTA Guidelines) (May 2006). The incremental noise impact criteria included the FTA Guidelines, as presented in Table III.I-9 (Federal Transit Administration Impact Criteria

for Noise-Sensitive Uses), are based on USEPA Levels and subsequent studies of annoyance in communities affected by transportation noise and contained in the FTA Guidelines. The scientific rationale for the choice of these criteria is also explained in the FTA Guidelines. Starting from the EPA's definition of minimal noise impact as a 5 dBA change from an established protective ambient level, the FTA extended the EPA's incremental impact criteria to higher baseline ambient levels. As baseline ambient levels increase, smaller and smaller increments are allowed to limit increases in community annoyance (e. g., in residential areas with a baseline ambient noise level of 50 dBA L_{dn}, a 5 dBA increase in noise levels would be acceptable, while at 70 dBA L_{dn}, only a 1 dBA increase would be allowed).

Table III.I-9 Federal Transit Administration Impact Criteria for Noise-Sensitive Uses

Residences and Buildings Where People Normally Sleep[a]		*Institutional Land Uses with Primarily Daytime and Evening Uses*[b]	
Existing L_{dn} (dBA)	*Allowable Noise Increment (dBA)*	*Existing Peak Hour L_{eq} (dBA)*	*Allowable Noise Increment (dBA)*
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	3
70	1	70	3
75	0	75	1
80	0	80	0

SOURCE: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006.

a. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.

b. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.

The FTA has also developed criteria for judging the significance of vibration produced by transportation sources and construction activity, as shown in Table III.I-10 (Groundborne Vibration Impact Criteria for General Assessment).

Under Federal Highway Administration (FHWA) regulations, noise abatement must be considered for new highway construction and highway reconstruction projects when the noise levels approach or exceed the noise-abatement criteria. For residential, school and other noise sensitive sites, these criteria indicate that the equivalent noise level (L_{eq}) during the noisiest 1-hour period of the day should not exceed 67 A-weighted decibels (dBA) at the exterior or 52 dBA within the interior. For commercial purposes, the exterior L_{eq} should not exceed 72 dBA.

Table III.I-10 Groundborne Vibration Impact Criteria for General Assessment

Land Use Category	*Impact Levels (VdB; relative to 1 micro-inch/second)*		
	Frequent Events[a]	*Occasional Events*[b]	*Infrequent Events*[c]
Category 1: Buildings where vibration would interfere with interior operations	65[d]	65[d]	65[d]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

SOURCE: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006.

a. "Frequent Events" is defined as more than 70 vibration events of the same source per day.

b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.

c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.

d. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels.

Federal Aviation Administration

Federal Aviation Administration (FAA) regulations (i.e., Part 150, Airport Noise Compatibility Planning) prescribe the methodology governing the development, submission, and review of airport noise exposure maps and noise compatibility programs. The noise exposure maps use average annual L_{dn} or CNEL contours around the airport as the primary noise descriptor. To the FAA, all land uses are considered compatible when aircraft noise effects are less than 65 dB L_{dn} or CNEL. At higher noise exposures, increasing restrictions are applied to development within the aircraft noise contours depending upon the noise-sensitivity of the land use and the degree of noise attenuation required in the structures' interior spaces. As shown in Figure III.I-3, the Project site is well outside SFO's 65 dBA CNEL noise contour.

State

Governor's Office of Planning and Research

The Governor's Office of Planning and Research (OPR) *General Plan Guidelines 2003* (GP Guidelines) promotes use of L_{dn} or CNEL for evaluating the compatibility of various land uses with respect to their noise exposure. The designation of a level of noise exposure as "normally acceptable" for a given land use category implies that the interior noise levels would be acceptable to the occupants without the need for any special structural acoustic treatment. The GP Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels. The GP Guidelines provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the USEPA Levels influenced the recommendations of the GP Guidelines, most importantly in the choice of noise exposure metrics (i.e., L_{dn} or CNEL) and in the upper limits for the "normally acceptable" outdoor exposure of noise-sensitive uses (i.e., no higher than 60 dBA L_{dn}/CNEL for residential, which is obtained when the EPA's 5 dBA margin of safety is added to the baseline noise exposure level of 55 dBA level that the USEPA believes is completely adequate to protect public health and welfare).

Title 25 (California Noise Insulation Standards)

The California Noise Insulation Standards (*California Code of Regulations*, Title 25, Section 1092) establishes uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 25 states that interior noise levels attributable to exterior sources shall not exceed 45 dBA L_{dn} or CNEL (the same levels that the EPA recommends for residential interiors) in any habitable room of new dwellings. Acoustical studies must be prepared for proposed multiple unit residential and hotel/motel structures where outdoor L_{dn} or CNEL is 60 dBA or greater. The studies must demonstrate that the design of the building would reduce interior noise to 45 dBA L_{dn} or CNEL, or lower. Dwellings are to be designed so that interior noise levels would meet this standard for at least ten years from the time of building permit application. Interior noise levels can be reduced through the use of noise insulating windows, and by using sound isolation materials when constructing walls and ceilings. The primary means to achieve this standard is through the use of noise insulating windows, and/or sound isolation materials when constructing walls and ceilings.

Local

San Francisco General Plan

The *San Francisco General Plan* provides long-term guidance and policies for maintaining and improving the quality of life and the man-made and natural resources of the community. The Environmental Protection Element of the *San Francisco General Plan* is concerned primarily with avoiding or mitigating the adverse effects of transportation noise. However, many of the Objectives and related Policies of the *Transportation Noise* section could be applicable to noise from other sources (including noise from crowds, public address systems, and concert noise from a stadium):

Objective 10 Minimize the impact of noise on affected areas.

Policy 10.1 Promote site planning, building orientation and design, and interior layout that will lessen noise intrusion.

Policy 10.2 Promote the incorporation of noise insulation materials in new construction.

Objective 11 Promote land uses that are compatible with various transportation noise levels.

Policy 11.1 Discourage new uses in areas in which the noise level exceeds the noise compatibility guidelines for that use.

The "Land Use Compatibility Chart for Community Noise" included in Policy 11.1 specifies the compatibility of different land use types within a range of ambient noise levels.

For residential uses:

- Noise exposure is considered "satisfactory, with no special noise insulation requirements" where the L_{dn} is 60 dBA or less.
- "New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design" where the L_{dn} is between 60 dBA and 70 dBA.

- "New construction or development should generally be discouraged" where L_{dn} is over 65 dBA.

For other noise-sensitive uses (i.e., schools, libraries, churches, hospitals, nursing homes):

- Noise exposure is considered "satisfactory, with no special noise insulation requirements" where the L_{dn} is 65 dBA or less.
- "New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design" where the L_{dn} is between 62 dBA and 70 dBA.
- "New construction or development should generally not be undertaken" where L_{dn} is over 65 dBA.

Policy 11.3 Locate new noise-generating development so that the noise impact is reduced.

San Francisco Noise Ordinance (Article 29, San Francisco Police Code)

The Noise Ordinance specifically recognizes that adverse effects on a community can arise from noise sources such as transportation, construction, mechanical equipment, entertainment, and human and animal behavior. The San Francisco Noise Ordinance (Article 29, *San Francisco Police Code*, Section 2900) makes the following declaration:

> It shall be the policy of San Francisco to maintain noise levels in areas with existing healthful and acceptable levels of noise and to reduce noise levels, through all practicable means, in those areas of San Francisco where noise levels are above acceptable levels as defined by the World Health Organization's Guidelines on Community Noise.

The following policies are included to address and limit disruptive noise intrusions from these sources.

Waste Disposal Services (Section 2904)

The Noise Ordinance limits noise from waste disposal services mechanical or hydraulic device to 75 dBA when measured from 50 feet. This maximum noise level does not apply to the noise associated with crushing, impacting, dropping, or moving garbage on the truck, but only to the truck's mechanical processing system.

Construction (Sections 2907 and 2908)

The Noise Ordinance limits noise from powered construction equipment to a level of 80 dBA at a distance of 100 feet (or an equivalent level at some other distance).[217] This does not apply to impact tools (provided they are equipped with appropriate noise control features recommended by the manufacturers and approved by the Director of Public Works or the Director of Building Inspection) nor to construction

[217] By definition, Noise Ordinance Section 2901j states "Powered construction equipment" means any tools, machinery, or equipment used in connection with construction operations which can be driven by energy in any form other than manpower, including all types of motor vehicles when used in the construction process of any construction site, regardless of whether such construction site be located on-highway or off-highway, and further including all helicopters or other aircraft when used in the construction process except as may be preempted for regulation by state or federal law.

equipment used in connection with emergency work. Also, construction activities are generally prohibited between the hours of 8:00 P.M. and 7:00 A.M. if the noise created would be in excess of the ambient noise level by 5 dBA at the nearest property line (although exceptions to these limits can be made in certain cases by the Director of Public Works or the Director of Building Inspection).

Noise Limits (Section 2909)

The Noise Ordinance limits noise from sources defined as "any machine or device, music or entertainment or any combination of same" located on residential or commercial/industrial property to 5 dBA or 8 dBA, respectively, above the local "ambient"[218] at any point outside of the property plane of a residential, commercial/industrial or public land use, respectively, containing the noise source. An additional low-frequency criterion applies to noise generated from a licensed Place of Entertainment, specifically that no associated noise or music shall exceed the low-frequency ambient noise level by more than 8 dBC.

The Noise Ordinance limits noise from a fixed "source"[219] from causing the noise level measured inside any sleeping or living room in any dwelling unit located on residential property to 45 dBA between the hours of 10:00 P.M. to 7:00 A.M. or 55 dBA between the hours of 7:00 A.M. to 10:00 P.M. with windows open except where building ventilation is achieved through mechanical systems that allow windows to remain closed.

Variances (Section 2910)

The Noise Ordinance gives the Directors of Public Health, Public Works, Building Inspection, or the Entertainment Commission, or the Chief of Police authority to grant variances to noise regulations over which they have jurisdiction. The Department of Public Health has jurisdiction over sources specified in Noise Limits (Section 2909), the Departments of Building Inspection and Public Works over sources specified in Construction (Sections 2907 and 2908), and the Director of the Entertainment Commission may enforce noise standards associated with licensed Places of Entertainment.

III.I.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to noise, but generally consider that implementation of the Project would have significant impacts if it were to:

I.a Result in exposure of persons to or generation of noise levels in excess of standards established in the Environmental Protection Element of the *San Francisco General Plan* or San Francisco Noise Ordinance (Article 29, *San Francisco Police Code*)

[218] By definition, Noise Ordinance Section 2901a states "ambient" means the lowest sound level repeating itself during a minimum ten-minute period as measured with a type 1, precision sound level meter, set on slow response and A-weighting … in no case shall the ambient be considered or determined to be (1) less than 35 dBA for interior residential noise, and (2) 45 dBA in all other locations."

[219] By definition, Noise Ordinance (Section 2901e) states "fixed source" means a machine or device capable of creating a noise level at the property upon which it is regularly located, including but not limited to: industrial and commercial process machinery and equipment, pumps, fans, air-conditioning apparatus or refrigeration machines.

I.b Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels

I.c Result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project

I.d Result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project

I.e For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the Project expose people residing or working in the area to excessive noise levels

I.f For a project located in the vicinity of a private airstrip, would the Project expose people residing or working in the project area to excessive noise levels

I.g Be substantially affected by existing noise levels

Based on the following quantitative significance thresholds specifically included in the City of San Francisco *General Plan* or Noise Ordinance, the Project would cause or be subject to a significant noise or vibration impact if it would:

- **During Construction**
  - > Generate construction noise between the hours of 8:00 P.M. and 7:00 A.M. that exceeds the ambient noise level by 5 dBA at the nearest property line (unless a special permit has been granted by the Director of Public Works or the Director of Building Inspection); or produce noise by any construction equipment (except impact tools) that would exceed 80 dBA at 100 feet. (Criteria I.a and I.d)
- **During Operation**
  - > Cause an increase in noise (i.e., as produced by "any machine or device, music or entertainment or any combination of same") greater than 5 dBA or 8 dBA above the local ambient (i.e., defined as the "lowest sound level repeating itself during a minimum 10-minute period as measured with a sound level meter, using slow response and A-weighting")[220] at any point outside the property plane of a residential, commercial/industrial or public land use, respectively, containing the noise source. (Criteria I.a, I.c, or I.d)
  - > In the case of noise or music generated from a "licensed Place of Entertainment," cause an increase in low frequency ambient noise (i.e., defined as the "lowest sound level repeating itself during a 10-minute period as measured with a sound level meter, using slow response and C-weighting") by more than 8 dBC. (Criteria I.a, I.c, or I.d)

In the following cases where quantitative significance thresholds may not be included in the City of San Francisco *General Plan* or Noise Ordinance, the Project would cause or be subject to a significant noise or vibration impact if it would:

[220] Although not explicitly stated in the San Francisco Noise Ordinance (Section 2901), the "ambient" level would most likely correspond to the L_{90} descriptor (i.e., the sound level exceeded 90% of the time) because of the operative words *"lowest sound level repeating itself"* in the Ordinance definition; there is a 10% chance that sound levels at or lower than L90 would repeat during a 10-minute period, whereas the L_{min} would likely occur only once.

- For football game or concert noise from the proposed Stadium:[221]
  - > Cause L_{dn} on a typical football day to increase by 1 dBA or more in a residential area where existing ambient L_{dn} already exceeds 65 dBA or would exceed 65 dBA with the game/concert noise added[222] (Criteria I.a, I.c, or I.d)
  - > Result in L_{max} levels in the residential area that exceed 75 dBA.[223] (Criteria I.a, I.c, or I.d)
  - > Expose persons to or generate groundborne vibrations from construction activities that exceed the FTA vibration impact thresholds for residential and other vibration-sensitive land uses as specified in Table III.I-10. (Criterion I.b)
- Cause outdoor traffic noise levels at existing or proposed residential and other noise-sensitive uses to increase by more than the FTA criteria specified in Table III.I-9, which vary depending on the baseline ambient noise levels. (Criterion I.c)
- Cause excessive annoyance, activity disruption, or sleep disturbance due to noise from SFO-related aircraft operations at the proposed residential uses to be located on the Project site according to FAA criteria (i.e., aircraft noise level of 65 dBA L_{dn} or greater). (Criteria I.e, I.f, and I.g)

Analytic Method

As noted above, long-term 24-hour ambient noise measurements were taken at six locations in the residential neighborhoods north and west of the Project site for a total of six days in 2009. The long-term ambient noise measurements were conducted over the course of three days in January 2009, and again in July 2009. Both the A-weighted and C-weighted measurements were for 24-hour periods during the respective measurement times and were recorded using Larson Davis digital sound level meters. Table III.I-3 through Table III.I-5 show the results of the long-term L_{eq} and the A-and C-weighted results respectively, while Figure III.I-1 shows the locations of these measurements.

The analysis of the existing and future noise environments is based on noise-level monitoring, noise-prediction computer modeling, and empirical observations of receptor noise exposure characteristics. Existing short-term noise levels were monitored at selected locations in and around the Project site using a Larson-Davis Model 820 sound level meters. These short-term noise measurements were taken on May 20, 2009, between the hours of 3:00 P.M. and 6:00 P.M. for 15 minutes each. The results of these noise measurements are shown in Table III.I-6, while Figure III.I-2 shows the location of these measurements.

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[221] Although there is an existing football stadium on the Candlestick Point site, construction of the proposed Stadium at a different location on the Hunters Point Shipyard site has the potential to expose other noise-sensitive uses near the new location to substantial additional football game and concert noise. Also, the public address system in the proposed Stadium is likely to be different than the one at the existing facility and this difference is included in the noise model used for this analysis. The football game/concert noise impact analysis focuses only on potential adverse noise impacts from the proposed Stadium with respect to the significance criteria presented above.

[222] The General Plan *Land Use Compatibility Chart for Community Noise* sets 65 dBA L_{dn} as the lowest level at which "*new [residential] construction or development should generally be discouraged.*" This level is taken as the point at which noise from the proposed stadium would begin to substantially interfere with the residential character of the existing neighborhood.

[223] Interior L_{max} noise levels that exceed 60 dBA would generally be considered to cause interference with normal speech indoors or with activities that involve speech comprehension (e.g., watching television), whereas L_{max} noise levels that are less than 55 dBA would generally not interfere. Since residential structures typically provide 15 to 20 dBA of exterior-to-interior noise level reduction with windows closed, as long as exterior L_{max} noise levels did not exceed 75 dBA substantial interference with normal speech or speech comprehension would not occur indoors.

Traffic noise modeling procedures involved the calculation of existing and future vehicular noise levels at selected noise-sensitive uses in the vicinity of the Project site using the FHWA Traffic Noise Model (TNM). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, truck mix, distance from roadway to receptor, and site environmental conditions. The average vehicle noise rates (energy rates) utilized in TNM reflects the latest measurements of average vehicle noise rates for all vehicle classes. Traffic volumes utilized as data inputs in the noise prediction model were provided through the traffic analysis prepared for this EIR. For purposes of analysis, the average peak-hour traffic volumes were extrapolated from the Project traffic study and input into the model to estimate existing and future traffic noise levels on roadway segments in the Project vicinity where existing or reasonably foreseeable sensitive receptors are located.

The proposed stadium would primarily be used for football games, but may also be used occasionally for popular music concerts. The proposed stadium design, measured game and concert noise data gathered from similar existing facilities, the influence of surrounding topography and meteorology, and the location of noise-sensitive receptors (primarily residential) in the area were developed as input parameters to the community noise prediction computer model SoundPLAN®. The sound emission characteristics of both the stadium's "house" sound system (the permanent sound system that would be utilized during football games) and that of a portable system characteristic of concerts were used in the SoundPLAN® model to (1) project noise levels in the community for both games and concerts; (2) to evaluate whether noise impacts would potentially occur; and (3) determine the possible need for mitigation and the details of such mitigation.

Aircraft noise levels on the Project site were estimated using available data from SFO. The noise analysis considered the existing CNEL and SEL noise data as likely exposure for the proposed residential uses on site.

Construction noise and vibration levels were quantified using equipment noise reference levels and modeling techniques developed by the FTA.[224]

Construction Impacts

Impact NO-1: Exposure of Persons to Excessive Noise Levels

Impact of Candlestick Point

Impact NO-1a **Construction at Candlestick Point would generate increased noise levels for both off-site and on-site sensitive receptors; however, the Project's construction noise impacts would occur primarily in noise-sensitive areas adjacent or near to active construction sites (which would vary in location and duration over the entire period the proposed Project would be under construction), they would not occur during recognized sleep hours, and would be consistent with the requirements for construction noise that exist in Sections 2907 & 2908 of the *Municipal Code*. (Less than Significant with Mitigation) *[Criterion I.a]***

[224] It is the City's standard that noise impact findings be based on the City's General Plan and Noise Ordinance significance criteria. However, for the purposes of this EIR analysis, the traffic noise and vibration analysis are based on the FTA (2006) criterion. The methodology and impact conclusions would be the same using either criterion.

- It is anticipated that the Project would be constructed beginning in 2011 with full build-out by 2031 and full occupancy in 2032, which represents an approximately 20-year construction period. Figure II-16 (Proposed Site Preparation Schedule) illustrates the site preparation sequence that precedes building construction. Figure II-17 (Proposed Building and Parks Construction Schedule) illustrates the building construction sequence.

  Construction activities would include demolition, site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other types of mobile and stationary construction equipment. The Project's construction would require heavy-duty equipment such as excavators, a drill rig, concrete mixers, and pump trucks would be used during the demolition of existing buildings, grading and foundation work. Excavation and grading in the Jamestown and Alice Griffith districts would be likely to encounter hard bedrock, requiring the use of heavy construction equipment. Heavy construction equipment rock removal methods include ripping (such as a Caterpillar D9 tractor with ripper attachment) and mechanical rock-breaking utilizing hammers, splitters or cutters. The mid and high-rise residential towers to be developed at CP North and CP South, as well as the shoreline improvements and development of the Yosemite Slough bridge would require the use of pile-driving equipment.

  Construction activities would also involve the use of smaller power tools, generators, and other equipment that generate noise. Haul trucks using the local roadways would generate noise as they move along the road. Each stage of construction would involve a different mix of operating equipment, and noise levels would vary based on the amount and types of equipment in operation and the location of the activity. Table III.I-11 (Construction Equipment Noise Emission Levels) provides average noise levels for standard construction equipment. Figure III.I-5 (Existing and Future Noise-Sensitive Land Uses in Project Site and Vicinity) illustrates the location of existing and future noise-sensitive land uses within and in the vicinity of the Project site.

Construction Impacts at Off-Site Noise-Sensitive Receptors

Average noise levels at sensitive receptors off site would vary by construction phase and depend on the equipment used, the duration of the construction phase, and the proximity of construction activity to the noise-sensitive receptors. The Project would improve existing roadways to serve Candlestick Point and HPS Phase II and surrounding Bayview and Hunters Point neighborhoods. Improvements would be within the Project boundaries, and off site as shown in Figure II-12 (Proposed Roadway Improvements) in Chapter II (Project Description). These improvements would include widening, re-striping, and/or reconfiguration of roadway segments and intersections. Construction activities associated with roadway improvements would be located within 25 feet of existing residential uses in the BVHP neighborhood along Gilman Avenue, Carroll Avenue, and Ingalls Street. Additionally, construction activities that would occur within Candlestick Point, including the demolition and redevelopment of the Alice Griffith Public Housing and within the Jamestown district would be located within 25 feet of existing residential uses along Gilman Avenue and Jamestown Avenue, respectively.

Table III.I-11 Construction Equipment Noise Emission Levels

Equipment	*Typical Noise Level (dBA) 50 ft from Source*
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

SOURCE: Table based on an EPA report (US Environmental Protection Agency, "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," NTID300.1, December 31, 1971), measured data from railroad construction equipment taken during the Northeast Corridor Improvement Project, and other measured data.

SOURCE: Lennar, 2009; CCSF, 2007; PBS&J, 2010. PBS&J 04.21.10

FIGURE III.I-5 ~~Candlestick~~ ~~Point~~ - ~~Hunters~~ ~~Point~~ ~~Shipyard~~ ~~Phase~~ II ~~EIR~~
EXSITING AND FUTURE NOISE SENSITIVE LAND USES IN PROJECT SITE AND VICINITY

Due to different densities of the underlying bedrock at Candlestick Point, controlled rock fragmentation may be utilized during general excavation and grading of the residential uses in the Jamestown and Alice Griffith districts. Controlled rock fragmentation technologies include pulse plasma rock fragmentation (PPRF), controlled foam or hydraulic injection, and controlled blasting (CB). In some scenarios it may be necessary to utilize a combination of these techniques. Controlled blasting can typically be performed at noise levels below typical building demolition levels (80-100 dBA) at the same distance. Table III.I-12 (Noise Levels for Controlled Rock Fragmentation Technologies) provides average noise levels for both PPRF and controlled blasting.

Table III.I-12 Noise Levels for Controlled Rock Fragmentation Technologies

Distance (Meters)	*PPRF (dBA)*	*CB (dBA)*
20	67.6	82.2
30	65.8	78.9
40	65.3	73.3

SOURCE: MACTEC Engineering and Consulting, Inc.

Off-site roadway improvements would utilize a pavement crusher (similar in noise levels to a grader), loaders and graders, as well as water and haul trucks. Based on the noise levels presented in Table III.I-11, the approximate noise levels experienced by adjacent noise-sensitive uses due to construction activities occurring during off-site roadway improvements, which are conservatively assumed to be 25 feet from the proposed improvement activity, would be approximately 92 dBA during the loudest off-site activities (noise from a grader).

Noise levels from excavation and grading activities associated with development at the Jamestown and Alice Griffith districts are estimated to be approximately 92 dBA due to the use of heavy construction equipment, such as D-9 Caterpillar Bulldozers. Controlled rock fragmentation activities (whether PPRF or CB) would also result in noise levels of approximately 67.6 to 82.2 dBA at distances of approximately 60 feet.

Construction Impacts at Future On-Site Noise-Sensitive Receptors

Residential uses that would be developed as part of the Project in Candlestick Point would be occupied starting in 2019, as shown in Table II-15 (Building Construction Completion Dates) in Chapter II (Project Description). These residential uses would be located in the Alice Griffith district. Subsequent residential uses in Candlestick Point are scheduled for occupancy in 2023, 2027, and 2032 in the CP North, CP South, CP Center, and Jamestown districts as shown in Figure II-16 (Proposed Site Preparation Schedule) and Figure II-17 (Proposed Building and Parks Construction Schedule). As shown in Table II-15, the commercial, neighborhood and regional retail, hotel and performance venue associated with Candlestick Point would be completed by 2023.

The Project would include redevelopment of Alice Griffith Public Housing to provide one-for-one replacement units. Eligible Alice Griffith Public Housing residents would have the opportunity to move to the new units directly from their existing Alice Griffith Public Housing units without having to relocate to any other area. Therefore, while construction would occur at one parcel, residents would continue to

reside at the remaining parcels. As such, these residents have been identified as on-site receptors during Project construction. Construction activities associated with grading and excavation, including controlled rock fragmentation activities in the Alice Griffith district, are estimated to be approximately 92 dBA at the residential uses of Alice Griffith due to the use of heavy construction equipment, such as D-9 Caterpillar Bulldozers. Controlled rock fragmentation activities (whether PPRF or CB) would also result in noise levels of approximately 67.6 to 82.2 dBA at distances of approximately 60 feet.

Construction of the residential and commercial uses in the remainder of Candlestick Point would include the development of high-rise mixed-use residential towers. Based on Table III.L-7 (Geotechnical Treatments for Candlestick Point Geotechnical Subparcels) in Section III.L (Geology and Soils), these high-rise towers would require the construction of deep foundations. The recommended construction method for these deep foundations would be to utilize pile drivers. As shown in Table III.I-11, pile drivers produce noise levels of approximately 101 dBA. As shown in Figure II-4 (Proposed Land Use Plan), the high-rise towers that would be closest to existing noise-sensitive uses would be located in the southwestern portion of the CP North district, approximately 150 feet from the redeveloped Alice Griffith district. Therefore, it is estimated that the greatest construction noise levels (during pile driving activities) associated with construction of Candlestick Point would be approximately 91 dBA at the residential uses in the Alice Griffith district.

Pile driving would also be required in the CP Center and CP South districts after residential uses have been occupied in these districts; therefore, pile-driving activities would also be located within 50 feet of occupied residential structures, and these uses would experience noise levels of approximately 101 dBA.

Pile driving activities would also be required for implementation of the shoreline improvements within Candlestick Point; however, as shown in Figure III.I-5, no noise-sensitive uses are located within approximately 500 feet of the shoreline improvement areas. It is, therefore, anticipated that pile-driving activities associated with the shoreline improvements would result noise levels for noise-sensitive receptors that are below the level of significance.

Construction activities that would not require pile driving would also generate noise levels in excess of 80 dBA in the occupied Alice Griffith district. Specifically, construction of the medium- and low-density residential uses in the CP North district would be located within approximately 50 feet of the residential uses in the Alice Griffith district. Based on the noise levels presented in Table III.I-11, and the diminishment of noise levels at a rate of 6 dBA per doubling of distance, the approximate noise levels from construction in the CP North district would result in noise levels of up to 88 dBA at the property line of the Alice Griffith residential uses from activities associated with excavation, paving, and external finishing.

Construction of Candlestick Point must comply with the San Francisco Noise Ordinance, which prohibits construction 8:00 P.M. and 7:00 A.M. Further, the Noise Ordinance would limit noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet unless the construction activity occurred during allowable hours.

As shown above, both on- and off-site noise-sensitive receptors in the Project vicinity could experience noise levels up to 91 dBA L_{eq} as a result of construction activities. *San Francisco Municipal Code* Sections 2907 & 2908 require that (1) noise levels from individual pieces of construction equipment, other than impact tools, not exceed 80 dBA at a distance of 100 feet from the source (the equipment generating the noise); (2) impact tools, such as jackhammers, must have both the intake and exhaust muffled to the satisfaction

of the Director of Department of Public Works (DPW); and (3) if the noise from construction would exceed the ambient noise levels at the property line of the site by 5 dBA, the work must not be conducted between 8:00 P.M. and 7:00 A.M., unless the Director of DPW authorizes a special permit for conducting the work during that period.[225]

To reduce the noise levels resulting from construction of the Project to the extent feasible for both on-site and off-site noise-sensitive receptors, the following mitigation measures shall be implemented:

MM NO-1a.1 *Construction Document Mitigation to Reduce Noise Levels During Construction. The Project Applicant shall incorporate the following practices into the construction documents to be implemented by the Project contractor:*

- *Provide enclosures and mufflers for stationary equipment, shrouding or shielding for impact tools, and barriers around particularly noisy operations on the site*
- *Use construction equipment with lower noise emission ratings whenever possible, particularly air compressors*
- *Provide sound-control devices on equipment no less effective than those provided by the manufacturer*
- *Locate stationary equipment, material stockpiles, and vehicle staging areas as far as practicable from sensitive receptors*
- *Prohibit unnecessary idling of internal combustion engines*
- *Require applicable construction-related vehicles and equipment to use designated truck routes to access the Project site*
- *Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, noise barriers or noise blankets. The placement of such attenuation measures will be reviewed and approved by the Director of Public Works prior to issuance of development permit for construction activities.*
- *Designate a Noise Disturbance Coordinator who shall be responsible for responding to complaints about noise during construction. The telephone number of the Noise Disturbance Coordinator shall be conspicuously posted at the construction site and shall be provided to the City. Copies of the construction schedule shall also be posted at nearby noise-sensitive areas.*

MM NO-1a.2 *Noise-reducing Pile Driving Techniques and Muffling Devices. The Project Applicant shall require its construction contractor to use noise-reducing pile driving techniques if nearby structures are subject to pile driving noise and vibration. These techniques include pre-drilling pile holes (if feasible, based on soils) to the maximum feasible depth, installing intake and exhaust mufflers on pile driving equipment, vibrating piles into place when feasible, and installing shrouds around the pile driving hammer where feasible.*

Contractors shall be required to use construction equipment with state-of-the-art noise shielding and muffling devices. In addition, at least 48 hours prior to pile-driving activities, the Project Applicant shall notify building owners and occupants within 500 feet of the Project site of the dates, hours, and expected duration of such activities.

Under mitigation measure MM NO-1a.1, the implementation of noise attenuation measures may include the use of noise barriers (e.g., sound walls) or noise blankets. As a general rule of thumb, if a noise source

[225] Warren, Elaine, email communication with Deputy City Attorney, City and County of San Francisco, October 2, 2009.

is completely enclosed or completely shielded with a solid barrier located close to the source, an 8 dBA noise reduction can be expected; if the enclosure and/or barrier is interrupted, noise would be reduced by only 5 dBA. [226] In addition, mitigation measure MM NO-1a.1, which requires that construction staging areas and earthmoving equipment be located as far away from noise and vibration-sensitive land uses as possible, would also reduce construction-related noise levels. Mitigation measure MM NO-1a.1 also would require that heavily loaded trucks traverse along pre-approved routes only, which would serve to reduce noise impacts from construction related truck trips. Mitigation measure MM NO-1a.2 would require that noise impacts from pile driving activities be reduced to the extent practicable by requiring pre-drilled holes and utilizing vibratory pile driving techniques as soil conditions would allow. MM NO-1a.2 would also require that the contractor utilize noise shrouds around the pile driving, which would serve to reduce noise levels by approximately 5 to 10 dBA.

- While the construction activities would occur over an approximately 20-year timeline, the activities that impact individual receptors would be temporary. The conditions under which noise levels would be considered excessive during construction activities, such as excavation or pile driving, would only occur for the duration of the specified activity and would only impact receptors located within 150 feet or closer of the noise producing activity. Once that particular construction activity was completed, the associated noise would no longer be experienced by the affected receptor.

The City allows for construction noise levels to exceed the standards established if the project complies with the Noise Ordinance as required by law, as well as include other construction noise attenuating features, such as those identified in mitigation measures MM NO-1a.1 and MM NO-1a.2, project-related construction noise impact would be considered to be less than significant. Construction noise would be reduced by mitigation measures MM NO-1a.1 and MM NO-1a.2. Further, as construction activities would only occur under the hours allowed under Sections 2907 and 2908, this impact would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact NO-1b **Construction at HPS Phase II would generate increased noise levels for both off-site and on-site sensitive receptors; however, the Project's construction noise impacts would be temporary, they would also not occur during recognized sleep hours, and would be consistent with the requirements for construction noise that exist in Sections 2907 and 2908 of the *Municipal Code*. (Less than Significant with Mitigation) *[Criterion I.a]***

Construction Impacts at Off-Site Noise-Sensitive Receptors

Off-site roadway improvements to Innes Avenue would result in construction activities occurring within 25 feet of residential uses along Innes Avenue. As described under Impact NO-1, noise levels associated with these off-site roadway improvements would be approximately 85 dBA at 50 feet; at 25 feet, which is a halving of distance, noise levels would increase by 6 dBA, which would result in a noise level 91 dBA due to grading activities.

[226] US Department of Transportation, Federal Highway Administration, *FHWA Roadway Construction Noise Model, Version 1.0 User's Guide*, Appendix A: Best Practices for Calculating Estimated Shielding for Use in the RCNM, January 2006.

Construction of the proposed football stadium would be located in HPS Phase II and would require pile-driving activities. As shown in Table III.I-11, pile drivers produce noise levels of approximately 101 dBA within 50 feet of the source. The closest off-site noise-sensitive receptor to the proposed football stadium would be the residential uses located in HPS Phase I. These residential uses are located approximately 600 feet from the proposed stadium; therefore, as stationary noise levels diminish by 6 dBA per doubling of distance, it is estimated that the greatest construction noise levels (during pile driving activities) associated with construction of the stadium would be approximately 77 dBA to 83 dBA, depending on the exact distance. It should be noted that the residential uses located at HPS Phase I are located along a ridge that serves to shield the residential uses from the stadium site, which would serve to further reduce construction related noise levels.

All off-site construction activities associated with HPS Phase II would be required to comply with Sections 2907 and 2908 of the Noise Ordinance and implement mitigation measures MM NO-1a.1 and MM NO-1a.2. Compliance with the Noise Ordinance and the identified mitigation measures would reduce the impact of construction noise to off-site receptors from construction related noise associated with HPS Phase II.

Construction Impacts at Future On-Site Noise-Sensitive Receptors

At HPS Phase II, new development would begin with the construction of the 49ers stadium, scheduled for completion during the 2014–2017 time period. HPS North district residential development would begin during 2011–2015 and is planned for completion by 2019. Build-out of the R&D district is planned by 2027. The mixed-use, neighborhood retail, and residential development at the HPS Village Center district would be completed in 2023. Based on the construction schedule, construction activities associated with the stadium, HPS North district, and R&D district would not impact on-site noise-sensitive uses. Construction of the HPS Village Center district would occur while the HPS North district residential uses are occupied and, therefore, could potentially impact the HPS North district residential uses.

Construction of the residential and commercial uses in the HPS Village Center district would include the development of high-rise mixed-use residential towers. Based on Table III.L-8 (Geotechnical Treatments for HPS Phase II Geotechnical Subparcels) in Section III.L, these high-rise towers would require the construction of deep foundations. The recommended construction method for these deep foundations would be to utilize pile drivers. The HPS Village Center district would be located within 50 feet of the HPS North district residential uses, as shown in Figure II-4. As shown in Table III.I-11, noise levels from pile driving activities could be as high as 107 dBA for the residential uses within the HPS North district (assuming a distance of 25 feet). Other construction activities such as grading, excavation, paving, and structural finishes would be anticipated to produce noise levels of up to 89 dBA.

Pile driving activities would also be required for implementation of the shoreline improvements within HPS Phase II; however, as shown in Figure III.I-5, no noise-sensitive uses are located within approximately 500 feet of the shoreline improvement areas. It is, therefore, anticipated that pile-driving activities associated with the shoreline improvements would not result in excessive noise levels for noise-sensitive receptors.

As stated under Impact NO-1a, the conditions under which noise levels would be considered excessive during construction activities, such as excavation or pile driving, would only occur for the duration of the specified activity and would only impact receptors located within 150 feet or closer of the noise producing activity. Once that particular construction activity was completed, the associated noise would no longer be experienced by the affected receptor.

Construction of HPS Phase II must comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. Further, the Noise Ordinance would limit noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet unless the construction activity occurred during allowable hours. Additionally, mitigation measures MM NO-1a.1 and MM NO-1a.2 would be implemented during construction of HPS Phase II. Construction noise would be reduced as required by mitigation measures MM NO-1a.1 and MM NO-1a.2. Further, as construction activities would only occur under the hours allowed under Sections 2907 and 2908 of the Noise Ordinance, noise from project construction would not violate any City Codes or other requirements placed on construction activity by the City or Agency and, therefore, this impact would be less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact NO-1 **Construction activities associated with the Project would generate increased noise levels for both off-site and on-site sensitive receptors; however, the Project's construction noise impacts would occur primarily in noise-sensitive areas adjacent or near to active construction sites (which would vary in location and duration over the entire period the proposed Project would be under construction); they would also not occur during recognized sleep hours, and would be consistent with the requirements for construction noise that exist in Sections 2907 and 2908 of the *Municipal Code*. (Less than Significant with Mitigation) *[Criterion I.a]***

Construction activities for the Project would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. While construction activities would occur over a 20-year timeline, the conditions under which noise levels would be considered excessive during construction activities, such as excavation or pile driving, would only occur for the duration of the specified activity and would only impact receptors located within 150 feet or closer of the noise producing activity. Construction activities must comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Impact NO-2: Exposure of Persons to Excessive Vibration Levels

Impact of Candlestick Point

Impact NO-2a **Construction at Candlestick Point would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 & 2908 of the *Municipal Code*, vibration levels would still be significant. (Significant and Unavoidable with Mitigation) *Criterion I.b]***

Although construction-related vibration associated with the Project would be temporary there are two potential impacts that could occur. First, vibration at high enough levels can result in human annoyance. Second, groundborne vibration can potentially damage the foundations and exteriors of fragile structures close enough to the construction activity. Damage potential is typically limited to vibration generated by impact equipment, especially pile drivers.

Most construction activities would only have the potential to generate low levels of groundborne vibration. Table III.I-13 (Vibration Source Levels for Construction Equipment) identifies various vibration velocity levels for the types of construction equipment that would operate on the Project site during construction.

Table III.I-13 Vibration Source Levels for Construction Equipment

	Approximate VdB			
Equipment	***25 Feet***	***50 Feet***	***75 Feet***	***100 Feet***
Large Bulldozer	87	78	69	60
Loaded Trucks	86	77	68	52
Jackhammer	79	70	61	52
Small Bulldozer	58	49	40	31
Pile Driver (Impact)	112	103	94	85
Pile Driver (Sonic)	105	96	87	78

SOURCE: Federal Transit Administration, 2006.

Construction Impacts as to Vibration at Off-Site Vibration-Sensitive Receptors

Roadway improvements would occur off site near Candlestick Point, and as stated under Impact NO-1a, the construction activity associated with these improvements would occur within 25 feet of residential uses long Gilman Avenue, Carroll Avenue, and Ingalls Street. Off-site roadway improvements would utilize pavement crushers, loaders and graders, as well as water and haul trucks. Based on the vibration levels presented in Table III.I-13, and the diminishment of vibration levels at a rate of 9 VdB per doubling of distance, the approximate groundborne vibration levels experienced by adjacent sensitive uses due to construction activities occurring during off-site roadway improvements would be approximately 86 VdB during the off-site construction activities (vibration from loaded trucks), which exceeds the 80 VdB threshold and would be significant.

Construction activities at off-site vibration-sensitive receptors would be significant and unavoidable. Implementation of mitigation measure MM NO-1a.1 would reduce this impact by requiring that vibration-producing equipment be located as far away from sensitive receptors as practicable. Additionally, construction activities would only occur during the hours of 7:00 A.M. to 8:00 P.M. and construction activity would be intermittent and temporary in nature. Implementation of MM NO-1a.1 would reduce vibration impacts, but not to a less-than-significant level; therefore, this impact would remain significant and unavoidable.

Construction Impacts as to Vibration at Future On-Site Vibration-Sensitive Receptors

The construction of residential towers in Candlestick Point would be developed after the redeveloped residential uses in the Alice Griffith district are occupied. Construction of these residential towers would likely require pile-driving activities. The closest residential towers that would be constructed when the

housing within the Alice Griffith district is occupied would be located in the southwestern portion of the CP North district, approximately 150 feet from the residential uses. As groundborne vibration levels attenuate at a rate of approximately 9 VdB per doubling of distance, it is estimated that vibration levels at the Alice Griffith Public Housing residential uses would be approximately 76 VdB. This would be below the 80 VdB threshold for human annoyance for infrequent events established in Table III.I-10. Pile driving would also be required in the CP Center and CP South districts; however, these areas would be located farther than 150 feet from the Alice Griffith Public Housing residential uses. It is, therefore, anticipated that vibration levels would be lower than 76 VdB identified for the CP North district.

Additionally, activities that would not require pile driving but would be located closer to the Alice Griffith Public Housing residential uses would not result in vibration levels that would exceed the 80 VdB threshold established for this EIR. While construction of the low and medium density residential uses within the CP North district would be located within 50 feet of the Alice Griffith Public Housing residential uses, these activities would not result in groundborne vibration above 80 VdB. Based on the data presented in Table III.I-13, vibration from large bulldozers that may be utilized during excavation activities would be approximately 78 VdB, which would be below the 80 VdB threshold.

Pile driving would also be required in the CP Center and CP South districts after residential uses have been occupied in these districts; therefore, pile driving activities would also be located within 50 feet of occupied residential structures. As shown in Table III.I-10, pile driving activities would potentially result in groundborne vibration levels of approximately 103 VdB at the residential uses located in the CP Center and CP South. This impact would be considered potentially significant.

Pile driving activities would also be required for implementation of the shoreline improvements within Candlestick Point; however, as shown in Figure III.I-5, no vibration-sensitive uses are located within approximately 500 feet of the shoreline improvement areas. It is, therefore, anticipated that pile-driving activities associated with the shoreline improvements would not result in excessive vibration levels for vibration-sensitive receptors.

No other construction activities associated with Candlestick Point would result in vibration levels that would exceed the threshold for on-site residential uses that would be located in Candlestick Point or Alice Griffith district during construction. This impact is less than significant.

In order to reduce potential impacts from pile driving activities, the following mitigation measure has been identified.

MM NO-2a *Pre-construction Assessment to Minimize Pile Driving Impacts. The Project Applicant shall require its geotechnical engineering contractor to conduct a pre-construction assessment of existing subsurface conditions and the structural integrity of nearby buildings subject to pile driving impacts prior to receiving a building permit. If recommended by the geotechnical engineer, for structures or facilities within 50 feet of pile driving, the Project Applicant shall require groundborne vibration monitoring of nearby structures. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the following:*

- *Pre-pile driving surveying of potentially affected structures*
- *Underpinning of foundations of potentially affected structures, as necessary*

- *The construction plan shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of an excavation. Monitoring results shall be submitted to DBI. In the event of unacceptable ground movement, as determined by DBI inspections, all pile driving work shall cease and corrective measures shall be implemented. The pile driving program and ground stabilization measures shall be reevaluated and approved by DBI.*

In summary, construction activities at off-site vibration-sensitive receptors would be significant and unavoidable. Implementation of mitigation measure MM NO-1a.1 would reduce this impact by requiring that vibration-producing equipment be located as far away from sensitive receptors as practicable. Mitigation measure MM NO-1a.2 would also be implemented, which would also serve to reduce potentially significant vibration impacts by requiring pre-drilled holes and alternate methods for driving piles, such as a vibratory/sonic pile driver in order to reduce noise and vibration levels. However, these methods would not reduce impacts from pile driving activities to less-than-significant levels. As shown in Table III.I-13, vibration levels from vibratory pile driving methods would be approximately 96 VdB at distances of 50 feet. Implementation of mitigation measure MM NO-2a would require that buildings within 50 feet of pile driving activities be monitored to ensure that groundborne vibration does not result in damage to structures.

Similar to construction noise levels, the conditions under which vibration levels would be considered excessive during construction activities, such as excavation or pile driving, would only occur for the duration of the specified activity and would only impact receptors located within 100 feet or closer of the vibration producing activity. Once the vibration producing activities were completed, the affected receptors would no longer be impacted. Additionally, construction activities would only occur during the hours of 7:00 A.M. to 8:00 P.M. as required by Sections 2907 and 2908 of the Noise Ordinance. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would reduce vibration impacts, but not to a less-than-significant level; therefore, this impact would remain significant and unavoidable.

Impact of Candlestick Point in the Alice Griffith and Jamestown Districts

Impact NO-2b **Rock removal activities in the Alice Griffith and Jamestown districts would result in vibration levels that exceed the FTA threshold of 80 VdB or could cause damage to structures from vibration caused by the fracturing of bedrock for excavation. (Significant and Unavoidable with Mitigation) *[Criterion I.b]***

Construction activities that would occur within Candlestick Point, including the demolition and redevelopment of Alice Griffith Public Housing and within the Jamestown district would be located within 25 feet of existing residential uses along Gilman Avenue and Jamestown Avenue, respectively. Hard bedrock encountered at both sites during general excavation and grading would be removed utilizing heavy construction equipment. Heavy construction equipment rock removal methods include ripping (such as a Caterpillar D9 tractor with ripper attachment) and mechanical rock-breaking utilizing hammers, splitters or cutters. Harder areas of bedrock may require alternative techniques for removal such as controlled rock fragmentation. Controlled rock fragmentation technologies include pulse plasma rock fragmentation (PPRF), controlled foam or hydraulic injection and controlled blasting.

As detailed further in Section III.L, vibration impacts from either PPRF or CB may result in damage to adjacent structures due to these activities fracturing adjacent rock bed and causing settlement or shifting

of the structures above. In order to ensure that this vibration-related impact is reduced to a less-than-significant level, mitigation measure MM GE-3a would be implemented and adjacent properties would be monitored during controlled rock fragmentation activities. With implementation of MM GE-3a, vibration from controlled rock fragmentation in the area would not cause damage to adjacent or nearby properties. Consequently, vibration impacts to buildings and structures related to controlled rock fragmentation would be reduced to less-than-significant levels.

While PPRF and CB would not result in vibration-related impacts, the use of heavy construction equipment, such as a D-9 tractor, would potentially result in vibration levels that would exceed 80 VdB. As stated under Impact NO-1a.1, the demolition and redevelopment of the Alice Griffith Public Housing and the Jamestown district would be located within 25 feet of existing residential uses along Gilman Avenue and Jamestown Avenue, respectively. As shown in Table III.I-13, vibration levels from a large bulldozer (equivalent to a D-9 tractor) would be approximately 87 VdB at distances of 25 feet. While mitigation measure MM NO-1a.1 would reduce this impact by requiring that construction equipment be staged and operated as far from noise and vibration-sensitive uses as practicable, the excavation activity would occur within 25 feet of vibration-sensitive uses. Therefore, this impact would be significant and unavoidable.

Impact of Hunters Point Shipyard Phase II

Impact NO-2c **Construction at HPS Phase II would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 & 2908 of the *Municipal Code*, vibration levels would be significant. (Significant and Unavoidable with Mitigation) *[Criterion I.b]***

Construction Impacts as to Vibration at Off-Site Vibration-Sensitive Receptors

Off-site roadway improvements to Innes Avenue would result in construction activities occurring within 25 feet of existing residential uses along Innes Avenue. As described under Impact NO-2a, the approximate groundborne vibration levels experienced by adjacent sensitive uses due to construction activities occurring during off-site roadway improvements would be approximately 86 VdB during the off-site construction activities (vibration from loaded trucks).

Construction of the proposed football stadium would require pile-driving activities. The closest off-site vibration-sensitive receptor to the proposed football stadium would be the residential uses located in HPS Phase I. These residential uses are located approximately 600 feet from the proposed stadium; therefore, as stationary vibration levels diminish by 9 dBA per doubling of distance, it is estimated that the greatest construction vibration levels (during pile driving activities) associated with construction of the stadium would be approximately 62.5 VdB, which is below the level of significance. Additionally, the elevated location of HPS Phase I would further reduce vibration levels from HPS Phase II construction activities.

Construction Impacts as to Vibration at Future On-Site Vibration-Sensitive Receptors

Construction of the residential and commercial uses in the HPS Village Center would include the HPS Phase II Geotechnical Subparcels) in Section III.L, these high-rise towers would require the construction of deep foundations. The recommended construction method for these deep foundations would be to utilize pile drivers. The HPS Village Center would be located within 50 feet of the HPS North district residential uses, as shown in Figure II-4. As shown in Table III.I-13, vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North district. This is a potentially significant impact.

Groundborne vibration levels associated with off-site roadway improvements along Innes Avenue would be approximately 86 VdB due to the vibration from loaded trucks and bulldozers for grading. This would exceed the FTA's 80 VdB threshold for residential uses for infrequent events. Additionally, construction activities associated with development of the HPS Village Center district would result in vibration levels of approximately 103 VdB at the newly developed HPS North district residential uses.

Implementation of mitigation measure MM NO-1a.1 would help to reduce this impact by requiring that vibration-producing equipment be located as far away from sensitive receptors as practicable. Mitigation measure MM NO-1a.2 would also be implemented, which would also serve to reduce potentially significant vibration impacts by requiring pre-drilled holes and alternate methods for driving piles, such as a vibratory/sonic pile driver in order to reduce vibration levels. However, these methods would not reduce impacts from pile driving activities to less-than-significant levels. Implementation of mitigation measure MM NO-2a would require that buildings within 50 feet of pile driving activities be monitored to ensure that groundborne vibration does not result in damage to structures.

Similar to construction noise levels, the conditions under which vibration levels would be considered excessive during construction activities, such as excavation or pile driving, would only occur for the duration of the specified activity and would only impact receptors located within 100 feet of the vibration producing activity. Once the vibration producing activities were completed, the affected receptors would no longer be impacted. Additionally, construction activities would only occur during the hours of 7:00 A.M. to 8:00 P.M. as required by Sections 2907 and 2908 of the Noise Ordinance. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would reduce vibration impacts, but not to a less-than-significant level; therefore, this impact would remain significant and unavoidable.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact NO-2 **Construction activities associated with the Project would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 & 2908 of the *Municipal Code*, vibration levels would still be significant. (Significant and Unavoidable with Mitigation) *[Criterion I.b]***

Construction activities could also create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District and the CP Center and South Districts when occupied. Additionally, excavation activities at the Alice Griffith area would result in vibration levels of approximately 87 VdB, due to the use of heavy construction equipment; therefore, this impact would remain significant and unavoidable, even with implementation of the identified mitigation measures.

Impact NO-3: Increases in Ambient Noise Levels

Impact NO-3 **Construction activities associated with the Project would result in a substantial temporary or periodic increase in ambient noise levels. (Significant and Unavoidable with Mitigation) *[Criterion I.d]***

Construction activities occurring within the Project site and in the Project vicinity for roadway and infrastructure improvements would involve demolition, grading, and excavation activities, followed by construction and external finishing of the proposed facilities and associated parking areas, as well as roadway and landscaping improvements. These activities would involve the use of heavy equipment. Pile driving activities would be required for development of the residential towers in the CP South district and the HPS North district, with noise levels of up to 107 dBA at a distance of 50 feet. Further, based on the noise levels presented in Table III.I-11, the approximate noise levels experienced by adjacent noise-sensitive uses due to construction activities occurring during off-site roadway improvements, which are conservatively assumed to be 50 feet from the proposed improvement activity, would be approximately 85 dBA during the loudest off-site activities (noise from a grader). Excavation activities at the Jamestown and Alice Griffith districts are estimated to be approximately 92 dBA for existing off-site receptors, due to the use of heavy construction equipment, such as D-9 Caterpillar Bulldozers.

Construction activities would also involve the use of smaller power tools, generators, and other equipment that generate noise. Each stage of construction would use a different mix of equipment, and noise levels would vary based on the amount and types of equipment in operation and the location of the activity related to potential receptors.

Mitigation measures MM NO-1a.1, MM NO-1a.2 and MM NO-2a have been identified to minimize or reduce construction related noise levels to the extent feasible. Implementation of mitigation measure MM NO-1a.1 would reduce this impact by requiring that noise-producing equipment be located as far away from sensitive receptors as practicable; however, construction activities would still occur within 25 feet of existing and future residential uses. Mitigation measure MM NO-1a.2 would also be implemented, which would also serve to reduce potentially significant vibration impacts by requiring pre-drilled holes and alternate methods for driving piles, such as a vibratory/sonic pile driver in order to reduce noise and vibration levels. However, these methods would not reduce impacts from pile driving activities to less-than-significant levels. As shown in Table III.I-11, noise levels during pile driving activities could reach up to 107 dBA at the existing

residential use in the Project vicinity, or in the new residential uses developed during earlier phases of the Project. The construction contractor would be required to implement noise attenuation measures during pile driving activities, including but not limited to the utilization of noise blankets, which would reduce noise levels up to 10 dBA. However, pile-driving and excavation activities would last throughout the 20-year construction phasing, and, therefore, this temporary increase in ambient noise levels would be noticeable and would likely be cause for human annoyance. Implementation of the above-mentioned mitigation measures would reduce the noise levels associated with impact the loudest construction activities identified above, but not to a less-than-significant level. Therefore, construction related temporary increases in ambient noise levels would be considered significant and unavoidable.

Operational Impacts

Impact NO-4: Exposure of Persons to Excessive Noise Levels

Impact NO-4 **Implementation of the Project, including the use of mechanical equipment or the delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City. (Less than Significant) *[Criterion I.c]***

Both Candlestick Point and HPS Phase II would include development of new commercial, retail, and residential uses. Daily operations of these uses would require mechanical cooling systems, deliveries of retail and commercial products and activities such as trash collection. These operational activities and systems would occur on a daily basis throughout the Project site once operational. Noise levels from these activities and systems would be similar throughout the entire Project site on a daily basis. It is anticipated upon build-out that the entire Project site would have a daily noise environment of a typical urban area with average noise levels ranging between 60 and 70 dBA.

Large-scale HVAC systems would be installed for the new residential, retail, and commercial buildings located on the Project site. Large HVAC systems associated with the residential, retail and commercial buildings can result in noise levels that average between 50 and 65 dBA L_{eq} at 50 feet from the equipment. As a project design feature, these HVAC units would be mounted within HVAC wells on the rooftops of the proposed buildings and would be screened with sufficient noise insulation by the walls and other building features, and, therefore, noise levels would not impact sensitive receptors on or off the Project site. Additionally, as additional project design features, noise from mechanical equipment associated with operation of the Project would be required to comply with Title 24 of the *California Building Code* requirements pertaining to noise attenuation, which requires that all multi-family residential units achieve an interior noise level of 45 dBA. Therefore, HVAC equipment would not be anticipated to produce noise levels that would be 5 dBA above the ambient noise level, which is the threshold under *Municipal Code* Section 2909(a).

Operation of the Project would also involve the delivery of goods and food stuffs to the commercial and retail operations associated with the Project, as well as refuse pick up for both the commercial and residential components. Two noise sources would be identified with delivery operations: the noise of the diesel engines of the semi-trailer trucks and the backup beeper alarm that sounds when a truck is put in reverse, as is required and regulated by Cal-OSHA. The noise generated by idling diesel engines typically ranges between 64 and 66 dBA L_{eq} at 75 feet. This noise would be temporary in nature, typically lasting no

more than five minutes. Backup beepers are required by Cal-OSHA to be at least 5 dBA above ambient noise levels. These devices are highly directional in nature, and when in reverse the trucks and the beeper alarm would be directed towards the loading area and adjacent commercial structures. Backup beepers are, of course, intended to warn persons who are behind the vehicle when it is backing up. Further, the loading docks associated with the Project would be screened from sensitive receptors both on site and off site by intervening structures and design of the loading spaces. In addition, noise generated by authorized City refuse collectors would be limited to 75 dBA per Section 2904 of the *Municipal Code*.

Daily operation of the Project such as loading dock activity, regional retail and other commercial activities would generate noise levels that are comparable to a typical urban environment. As such, mechanical systems, daily deliveries, and trash collection would not result in increases of 5 dBA over the anticipated ambient noise level. Therefore, the daily operational activity would not exceed the noise standards established by the *Municipal Code* and this impact would be considered less than significant. No mitigation is required.

Impact NO-5: Exposure of Persons to Excessive Vibration Levels

Impact NO-5 **Implementation of the Project would not generate or expose persons on or off site to excessive groundborne vibration. (Less than Significant) *[Criterion I.b]***

Typical background vibration levels in inhabited areas are about 50 VdB.[227] Such vibration background levels would be expected generally on the project site after the completion of all project-related construction activities. This is substantially less than the FTA's vibration impact threshold of 80 VdB for human annoyance. Groundborne vibration resulting from operation of the Project would primarily be generated by trucks making periodic deliveries to the Project site (including, but not limited to, garbage trucks, freight trucks and moving trucks). However, these types of deliveries would be consistent with deliveries that are currently made along roadways in the Project vicinity to nearby commercial uses, and on site as a result of ongoing commercial and R&D operations, and would not increase groundborne vibration above existing levels. No substantial sources of groundborne vibration would be built as part of the Project; therefore, operation of the Project would not expose sensitive receptors on site or off site to excessive groundborne vibration or groundborne noise levels, and this impact would be less than significant. No mitigation is required.

Impact NO-6: Exposure of Persons to Excessive Noise Levels

Impact NO-6 **Operation of the Project would generate increased local traffic volumes that could cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. (Significant and Unavoidable) *[Criterion I.c]***

The increase in traffic resulting from implementation of the Project and ambient growth over the next 20 years would increase the ambient noise levels at noise-sensitive locations along the major vehicular access routes to the Project site. Table III.I-14 (Modeled Noise Levels along Major Project Site Access Roads) identifies the changes in future noise levels along the study area roadway segments that have residential uses (and, therefore, are sensitive receptors). The noise levels identified in Table III.I-14 are presented in

[227] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (May 2006), Figure 7-3.

dBA L_{dn}. All future roadway analysis assumed completion of capital improvements as well as roadway improvement measures required as part of the Project's traffic mitigation measures as detailed in Section III.D (Transportation and Circulation).

Table III.I-14 Modeled Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*Project-Related Increase*	*Allowable Increase*	*Significant Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	0	2	No
3rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	1.0	1	No
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	0	2	No
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	0.5	2	No
Ingalls Street north of Carroll Avenue	Residential	56.7	61.7	63.1	1.4	2	No
Carroll Avenue east of 3rd Street[a]	Commercial	**52.6**	**53.8**	**58.1**	**4.3**	3	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**4.0**	2	**Yes**
Jamestown Avenue north of Harney Way	Residential	**51.4**	**55.5**	**61.2**	**5.7**	5	**Yes**
Harney Way west of Jamestown Avenue	Residential	52.6	59	59.6	0.6	3	No
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	0.1	1	No

SOURCE: PBS&J 2009

Noise model data sheets are available in Appendix I3 (Traffic Noise Model Output)

a. The land uses along Carroll Avenue are almost all commercial/industrial uses; the only exception is Alice Griffith Public Housing which is proposed for demolition and reconstruction and would be subject to Title 25 Noise Insulation Standards.

As stated in thresholds of significance, increases in ambient noise due to increases in Project-related traffic are based upon the FTA criteria specified in Table III.I-9. As baseline ambient levels increase, smaller and smaller increments are allowed to limit increases in community annoyance (e. g., in residential areas with a baseline ambient noise level of 50 dBA L_{dn}, a 5 dBA increase in noise levels would be acceptable, while at 70 dBA L_{dn}, only a 1 dBA increase would be allowed). Further, in order to demonstrate the Project's contribution to future noise levels, the baseline for traffic noise levels is the year 2030 without the Project compared to the year 2030 with the Project.

The greatest Project-related traffic noise increase (5.7 dBA L_{dn}) would occur along Jamestown Avenue, north of Harney Way. Additionally, two other roadway segments would experience substantial Project-related traffic noise level increases: Carroll Avenue, east of 3rd Street (4.3 dBA L_{dn}) and Gilman Avenue, east of 3rd Street (4.0 dBA L_{dn}). As shown in Table III.I-14, these increments are large enough to exceed the adopted threshold for a "substantial permanent increase" in traffic noise in residential areas. Figure III.I-6 (Project-Related Roadway Noise Level Increases) illustrates the roadways where noise levels would exceed the adopted threshold for a permanent increase in traffic noise.

Measures available to address significant traffic noise increases in these residential areas are limited. For example, the construction of continuous noise barriers at curbside along the entire length of the identified roadways would not be feasible because it would preclude residents' main vehicular access route to their homes and would conflict with the aesthetic character of the BVHP neighborhood by placing 6- to 8-foot-

SOURCE: PBS&J, 2010.

PBS&J 04.28.10

FIGURE III.I-6

~~Candlestick Point - Hunters Point Shipyard Phase II EIR~~

PROJECT-RELATED ROADWAY NOISE LEVEL INCREASES

high cinder block walls in front of residential front yards. While exterior noise levels would exceed the thresholds established in this EIR, in order to reduce human annoyance at existing residential uses from permanent increases in ambient noise levels, acoustical testing and retrofitting the interior of such uses could potentially be performed to ensure that interior noise levels would not exceed 45 dBA. Investigation into the need for such acoustical upgrades would only be necessary for the residences along Gilman and Jamestown Avenues. The land uses along Carroll Avenue are almost all commercial/industrial uses (and, therefore, much less noise sensitive); the only exception is the existing Alice Griffith Public Housing at the west end of Carroll Avenue. But this residential use is proposed for demolition and reconstruction as part of the Project. As a multi-family residential use, the reconstructed Alice Griffith Public Housing residential uses would be required under California Noise Insulation Standards (Title 25) to ensure acceptable interior noise levels appropriate to its expected future noise exposure.

However, the ultimate feasibility and implementation of the noise insulation measures that would be required to reduce interior noise levels to 45 dBA would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. In order to implement an acoustical analysis and retrofitting program, the Project Applicant would have to gain to access to all potentially affected private residential units along the identified sections of Gilman and Jamestown Avenues, perform noise measurements and other tests within these private residential units, and install structural noise attenuation features and verify their effectiveness. Further, it is unknown whether the proper attenuation would be achievable at every impacted property. While double and triple paned windows would serve to reduce interior noise levels, due to the age of several structures, this may not be sufficient to reduce noise levels. Additionally, it is unlikely that many of these structures have air conditioning or other internal cooling mechanisms, and as such, open windows provide the main source of ventilation and cooling for these structures. Therefore, the residents would be required to choose between open windows for ventilation or closed windows for sound attenuation. In some cases, the structure may have to be entirely rebuilt in order to achieve the proper attenuation level.

Additionally, as shown in Table III.I-14, the change from current noise levels to 2030 without the Project is greater than 3 dBA for all roadway segments except for Carroll west of 3rd Street. In fact, along Innes north of Carroll Avenue the "without project" increase is 7.6 dBA, while the "with project" increase is 0.0 dBA. As such, it would be difficult to determine the ultimate contribution of the Project to the increase in ambient noise levels in a manner that would not unfairly burden this Project with reducing interior noise levels in existing residential uses. Therefore, as measures to reduce this impact would be considered infeasible, this impact would be considered significant and unavoidable. It should also be noted that the project future increase with the project would not result in a 24-hour community noise level above an estimated 68.6 dBA $L_{dn.}$ As shown in Table III.I-1, this would be within the range typical of a urban environment.

Further, while an acoustical and retrofitting program could reduce interior noise levels in some affected residential structures, if feasible, the exterior noise level increase would still exceed the threshold of significance established in this EIR, even with implementation of an acoustical and retrofitting program.

Impact NO-7: Exposure of Persons to Excessive Noise Levels

Impact NO-7 **Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert. (Significant and Unavoidable with Mitigation) *[Criterion I.d]***

Although the current stadium exists at Candlestick Point, this analysis recognizes that the proposed location on HPS Phase II could result in noise impacts on different and new receptors. This impact analysis is based upon the findings presented in the *Bayview DEIR San Francisco 49ers Stadium Operational Noise Study*, prepared by Wilson, Ihrig & Associates.

There are two general sources of noise during football games/concerts in the stadium that could produce noise that affects the surrounding community:

- The game spectators/concert audience
- Amplified speech and music broadcast over the stadium/concert sound system

There would also be event day changes to the traffic flows, with consequent changes in traffic noise levels and patterns, in the community. However, the traffic noise levels in the community during a game or concert day were not modeled for the following reasons:

- The percentage of game/concert attendees using local transit service and the site's improved connectivity to regional transit service are expected to increase from 19 percent under existing conditions to 25 percent.
- Levels of background traffic (i.e., motor vehicle use by local residents and others non-game attendees) using local streets would be suppressed due to avoidance of the area during a game/concert day.
- Since game/concert traffic would be temporally concentrated during the few hours before and after such events, such congestion would reduce the average traffic speeds with consequent lowering of traffic noise emissions.

Thus, the traffic noise levels presented above in Table III.I-14 for a non-event weekday could be considered upper bounds for the location and degree of traffic noise impacts on an event day and the potential significance of their cumulative impacts will be considered further below.

Unlike noise in the existing residential neighborhoods surrounding the stadium site, which is typically dominated by transportation sources that have a predictable pattern day-to-day and year-to-year, game/concert noise would occur on only a few days per year and would last only a few hours on those days, although it would be much louder than the current background noise in the immediate vicinity of the stadium than on non-game and non-concert days. For the purposes of this EIR, and as stated under the Significance Criteria for this section, an increase in community noise levels exceeding 65 L_{dn} at a noise-sensitive receptor, or an L_{max} increase above 75 dBA at a noise-sensitive receptor would be considered a significant impact.

Noise intensity during games/concerts, its variation over time, and the duration of games/concerts are important with regard to determining noise impacts. A 3-D computer noise model was developed using SoundPLAN® to estimate game/concert noise levels in the surrounding community. As shown in Figure III.I-1, the model receivers (i.e., R1 through R6) were located at representative locations in the potentially

affected existing residential areas near the project site, which are the same locations as the long-term noise monitoring sites (i.e., N1 through N6). The following new receivers were added to the noise model:

- R7 on Coleman Street at the proposed Project's new residential development closest to the stadium (mixed use at the HPS Village Center district)
- R8 at the closest point to the proposed Project's HPS Phase II Residential Density III area (HPS North district)
- R9 on Palou Avenue and Lane Street in the BVHP neighborhood
- R10 on Bayview Circle near Newhall Street in the BVHP neighborhood

Wind effects can increase noise levels downwind of a noise source, while reducing noise levels upwind. The prevailing winds for the Project study area originate from the west, northwest, or west-northwest directions, which would be acoustically favorable for neighborhood receivers and could reduce noise levels from the stadium as they would "carry" the noise over the San Francisco Bay. However, "no wind" conditions were chosen for modeling purposes to produce worst-case noise levels in the surrounding neighborhood.

A temperature inversion is a reversal of the normal atmospheric temperature gradient (i.e., lower temperature with increasing height above the ground). This can cause increased noise levels at distant receivers. Temperature inversion effects are difficult to model accurately and were not included in SoundPLAN® for this study.

Modeling of Crowd and Public Address System Noise Levels

Potential noise impacts associated with noise from the crowd and the proposed stadium's sound system were evaluated for a typical full-capacity football game. Projections assume a typical game is on the order of three hours with crowd and/or public address system (PA) noise sustained at typical maximum levels for an aggregate 45 minutes over the 3-hour period.

For each noise source, estimates were made for typical maximum noise levels (L_{max}) and the day night level (L_{dn}) for a typical game day. The game day L_{dn} calculations are based on a noise energy summation of the existing ambient hourly L_{eq} noise levels at each location (i.e., as measured or extrapolated from measured data) and the projected game noise levels at that location. The L_{dn} calculations assume typical games would be during evening hours and would not continue past 10:00 P.M., which could substantially affect the L_{dn}, as this noise scale is adjusted to account for some individuals' increased sensitivity to noise levels during the evening and nighttime hours. Thus, game delays or other reasons for game operations continuing past 10:00 P.M. would increase the potential for noise impacts.

Table III.I-15 (Predicted Crowd and PA Combined Noise Levels [No Wind Condition]) present the modeling results for combined crowd noise and PA system noise. The combined noise levels are slightly higher than the larger of the crowd or PA noise level components, but present a more conservative estimate, which would vary at each receiver location. The location of the model receiver locations is illustrated by Figure III.I-7 (3-D Computer Noise Model).

Table III.I-15 Predicted Crowd and PA Combined Noise Levels (No Wind Condition)

Model Receiver	*Distance from proposed Stadium (miles)*[a]	*L_{max} (dBA)*[b]	*Game Day L_{dn}*[c]	*L_{dn} Increase over Existing*[d]	*Proposed Criteria Exceeded*
R1	1.0	61	63 to 67	<1 dBA	None
R2	1.0	64	63 to 65	<1 dBA	None
R3	0.3	**76**	**62 to 65**	**3 to 4 dBA**	**65 L_{dn}, 75 dBA L_{max}**
R4	0.7	66	65 to 66	<1 dBA	None
R5	0.9	62	62 to 65	<1 dBA	None
R6	1.4	58	59 to 60	<1 dBA	None
R7	0.2	**83**	**69**	**7 to 9 dBA**	**65 L_{dn}, 75 dBA L_{max}**
R8	0.3	**78**	**64 to 66**	**4 to 6 dBA**	**65 L_{dn}, 75 dBA L_{max}**
R9	1.3	55	63 to 65	<1 dBA	None
R10	1.6	57	65 to 66	<1 dBA	None

SOURCE: Wilson, Irhig & Associates, 2009.

a. Approximate distance to center of stadium.

b. L_{max} was estimated by SoundPLAN® and represents anticipated typical maximum noise levels expected during football games.

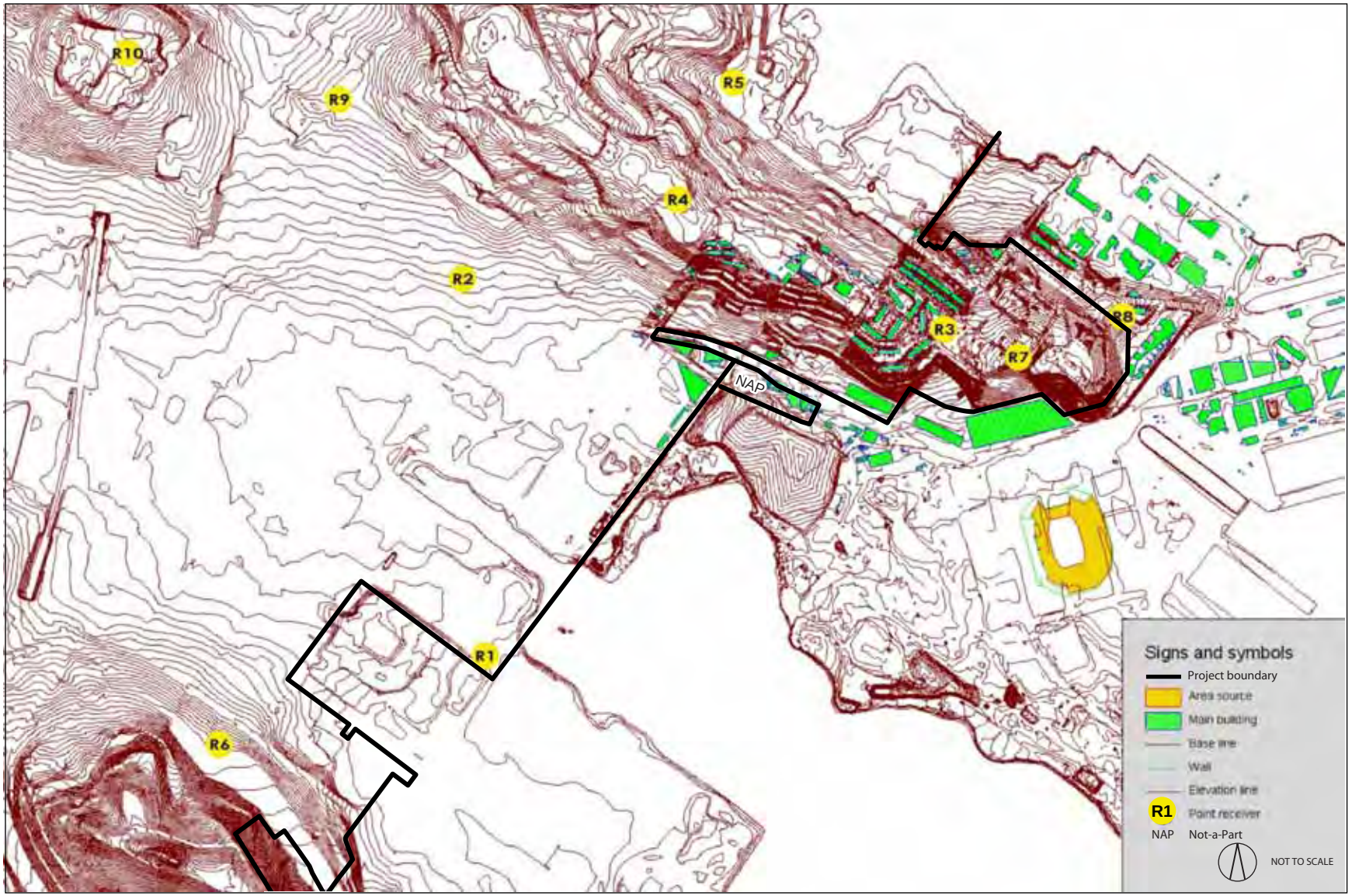
c. Based on noise energy summation of measured or assumed ambient plus SoundPLAN® predicted game noise levels.

d. Relative to representative ambient data.

The modeled noise impacts would occur at:

- R3, which is representative of the existing Hunters Point Hill residential neighborhood closest to the stadium. Here combined noise sources would increase the existing L_{dn} by 3 to 4 dBA, to a resultant L_{dn} as high as 65 dBA, while game-day maximum noise levels could be as high as 75 dBA. Thus, there is the potential to equal the L_{dn} impact criterion of 65 dBA and exceed the L_{max} criterion of 75 dBA at this location.
- R7, which is representative of the new residential development located in Hunters Point Phase I closest to the stadium (but not part of the Project). Here combined noise sources would increase the existing L_{dn} by 7 to 9 dBA, to a resultant L_{dn} as high as 69 dBA, while game-day maximum noise levels could be as high as 83 dBA. Thus, there is the potential to exceed both the L_{dn} and L_{max} criteria at this location.
- R8, which is representative of new Project residential use in the HPS North district, closest to the stadium. Here combined noise sources, would increase the existing L_{dn} by 4 to 6 dBA, to a resultant L_{dn} as high as 66 dBA, while game-day maximum noise levels could be as high as 78 dBA. Thus, there is the potential to exceed both the L_{dn} and L_{max} criteria at this location.

In general, potential football game noise impacts would be limited to areas near the stadium (i.e., within about 3,300 ft. from the stadium). In more distant areas, it is not likely that game operational levels would exceed the 65 dBA L_{dn} or the 75 dBA L_{max} noise impact criteria. However, for the existing residential uses closest to the proposed stadium (as characterized by Receiver R3) and possibly for the new residential uses closest to the proposed stadium (as characterized by Receivers R7 and R8) there would be significant noise impacts during football game days.



SOURCE: WILSON, IHRIG & Associates, Inc.

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FIGURE III.I-7

Candlestick Point — Hunters Point Shipyard Phase II EIR

3-D COMPUTER NOISE MODEL

Although game noise would not exceed the above-mentioned significance criteria outside a 3,300-foot radius from the stadium, there would be a potential for audibility at greater distances from noise generated during football games when background ambient noise in the neighborhoods is low (i.e., whenever the A-weighted game noise level is equal or greater than the A-weighted community background noise level, L_{90}). However, audibility alone is not sufficient for a finding of significance in this EIR. Candlestick Park is currently used for football games. Noise from 49er home games are audible over a wide area that would largely overlap with the area of audibility of football games played at the proposed stadium. Consequently, football game noise is already part of the existing ambient condition in the residential neighborhoods north and west of the Project site.

Nevertheless, the potential for football game noise to be easily detectable both outdoors and indoors was modeled and the results shown in Table III.I-16 (Audibility of Game Noise at Model Receivers). Crowd noise that is less than the background L_{90} would be masked at least 90% of the time, while crowd noise that exceeds the L_{10} would be easily detectable at least 90 percent of the time. Crowd noise would be easily detectable outdoors at times at distances up to about 1.6 miles from the stadium. Also, game L_{max} would exceed ambient background levels (i.e., L_{90}) at all modeled receivers by 8 dBA or more at all modeled receivers; this would equal or exceed the 8 dBA noise limit set by the San Francisco Noise Ordinance (Section 2909b). As for interior effects, assuming a 15 dBA nominal exterior-to-interior noise reduction provided by the building shell, which is typical for single family homes without special acoustical mitigation, maximum game noise levels would be audible indoors at times at Receivers R1, R2, R4, and R5. The location of the model receiver locations is illustrated by Figure III.I-7.

Table III.I-16 Audibility of Game Noise at Model Receivers

Model Receiver	*Distance from proposed Stadium (miles)*	*Exterior Ambient L_{10} (dBA)*	*Exterior Ambient L_{50} (dBA)*	*Exterior Ambient L_{90} (dBA)*	*Exterior Game L_{max}*	*Detectable Outdoors?*	*Interior Game L_{max} (dBA)*	*Detectable Indoors?*
R1	1.0	52 to 55	44 to 48	42 to 45	61	At least 22.5% of the time	46	**Yes**
R2	1.0	60 to 64	48 to 53	45 to 47	64	At least 12.5% of the time	49	**Yes**
R4	0.7	60 to 63	48 to 52	44 to 46	66	At least 12.5% of the time	51	**Yes**
R5	0.9	61 to 63	47 to 50	43 to 44	62	At least 12.5% of the time	47	**Yes**
R6	1.4	58 to 62	49 to 50	45 to 46	58	At least 12.5% of the time	43	No
R9	1.3	60 to 64	48 to 53	45 to 47	55	At least 2.5% of the time	40	No
R10	1.6	60 to 63	48 to 52	44 to 46	57	At least 2.5% of the time	42	No

SOURCE: Wilson, Irhig & Associates, 2009.

a. Ranges of "Exterior Ambient" for L_{10}, L_{50} and L_{90} are representative of afternoon or evening hours when games are most likely to occur.

b. Judgment of "Detectability" is based on comparisons of game L_{max} with an assumed indoor ambient background noise level of 45 dBA.

Modeling of Concert Noise Levels

The proposed stadium may be used occasionally as a venue for popular music concerts performed in front of a large audience. The sound system used for such a concert would not be the one permanently installed at the proposed stadium, but one specifically designed for and temporarily installed by each touring band.

The typical stage configuration during concerts would likely have the stage in the end zone for large events or at the 50-yard line for smaller shows. The noise impacts associated with large events were analyzed since this represents a worst-case condition for concert noise levels. Although the stage could be located at either end of the field (north or south), it was assumed the stage would be at the northern end of the field pointing south. In this way, most of the sound would be projected towards the Bay and away from residences.

Noise levels from a music concert would fluctuate greatly depending on the type of music being performed (e.g., rock, pop, hip-hop, etc.) and on the performers' preferred style of loudness. The latter affects the sound power settings used for the event. The loudness is also related to the size of the venue and to some degree the size of the audience. To address the variable range of music genre possible, recorded music samples were used to obtain sound spectra for rock and hip-hop music as two different styles of music that might use the Stadium as a concert venue. Other styles of music would generally be less percussive and, therefore, presumably have less of an impact on the surrounding community.

Table III.I-17 (Predicted Concert Sound System Noise Levels) present the modeling results for concert noise. Unless mitigations were implemented for the existing residential uses closest to the proposed stadium (as characterized by Receiver R3) and possibly for the new residential uses closest to the proposed stadium (as characterized by Receivers R7 and R8), there would be a potential for significant Project-induced concert noise impacts.

Table III.I-17 Predicted Concert Sound System Noise Levels

Model Receiver	*Distance (miles)*	*L_{max} (dBA)*	*L_{max} (dBC)*	*Concert L_{dn} (dBA)*	*L_{dn} Increase over existing (dBA)*	*Proposed Criteria Exceeded*
R1	1.0	57	78	63 to 67	< 1 dBA	None
R2	1.0	63	83	64 to 65	<1 to 1 dBA	None
R3	0.3	72	92	63 to 65	**3 to 5 dBA**	**65 L_{dn}**
R4	0.7	64	84	65 to 67	< 1 to 1 dBA	None
R5	0.9	63	82	62 to 65	< 1 dBA	None
R6	1.4	56	76	59 to 60	< 1 dBA	None
R7	0.2	75	95	65 to 67	**5 to 7 dBA**	**65 L_{dn}**
R8	0.3	63	83	59 to 63	1 dBA	None
R9	1.3	56	76	63 to 65	< 1 dBA	None
R10	1.6	58	78	65 to 66	< 1 dBA	None

SOURCE: Wilson, Irhig & Associates, 2009.

As with football game noise, there would also be a potential for outdoor audibility of concert noise at all receivers modeled, and for indoor audibility at distances up to 1.0 mile from the proposed Stadium. Also, game L_{max} would exceed both A-weighted and C-weighted ambient background levels at all modeled receivers by at least 8 dBA or 8 dBC, respectively; this would equal or exceed the noise limits set by the San Francisco Noise Ordinance (Section 2909b).

MM NO-7.1 *Mitigation to Minimize Game/Concert-related Temporary Increases in Ambient Noise Levels at Nearby Residences. To ensure that stadium game-and event-induced interior L_{max} noise levels do not*

exceed an interior noise level of 60 dBA and interfere with speech and other indoor activities in the existing Hunters Point Hill residential community closest to and north of the proposed Stadium (i.e., as identified by the R3 stadium noise model receiver), the Stadium Operator shall:

- *After Stadium Operator enters into lease agreement with Agency, send notification of the establishment of a stadium noise mitigation program (SNMP) to the residential property owners in the identified neighborhood potentially affected by noise from the proposed Stadium*
- *Allow property owners an appropriate time after the date of notification about the SNMP to apply for the program, with a reminder sent to the owners before the end of the application period*
- *Determine if responding property owners meet qualifications*
- *Compile for property-owners reference and send to them a summary of standard types of structural acoustical mitigations*
- *Choose a qualified acoustical consultant to survey the potentially affected residential units and recommend sound reduction measures appropriate to offset the modeled stadium noise impacts, which may include:*
  - *Acoustical upgrades to windows and doors*
  - *Acoustical stripping around doors and other openings*
  - *Ventilation improvements*
- *Estimates cost of recommended sound reduction measures, which shall include labor and materials, permit fees, and City inspections; material costs will, as much as possible, be based on "like-for-like", that is, for replacement of existing materials similar in quality or appearance*
- *Pay each qualifying property owner the amount of this estimate after obtaining a release from future claims for stadium event noise impacts at each property with each property owner responsible for implementing the sound reduction improvements*
- *Establish an ad hoc community working group of neighbors to develop a mediation process should any future disputes arise over the effectiveness of the SNMP in eliminating stadium noise intrusions*

MM NO-7.2 *Residential Use Plan Review by Qualified Acoustical Consultant. To ensure that stadium game-and event-induced interior L_{max} noise levels do not exceed an interior noise level of 60 dBA and interfere with speech and other indoor activities in the proposed on-site residential uses closest to the proposed Stadium, the Project Applicant shall choose a qualified acoustical consultant to review plans for the new residential uses planned for areas closest to the proposed Stadium and follow their recommendations to provide acoustic insulation or other equivalent measures to ensure that interior peak noise events would not exceed 60 dBA L_{max}.*

Unless mitigations were implemented for the residential uses that would be impacted as represented by modeling location R3, there would be a potential for significant stadium induced noise impacts during football games and concerts at this location. Implementation of mitigation measure MM NO-7.1 would ensure that these residential uses do not experience game/concert-related transient increases in ambient noise levels within their homes that would exceed 60 dBA L_{max}. Mitigation measure MM NO-7.2 would be implemented for new residential uses associated with the HPS Phase II site located in proximity of the proposed Stadium. Implementation of mitigation measure MM NO-7.2 would ensure that new residential uses at the HPS Phase II site would not experience noise levels associated with the Stadium uses that would interfere with regular interior activities, including speech and sleep.

However, the ultimate feasibility and implementation of the noise insulation measures recommended under mitigation measure MM NO-7.1 would depend on factors that would be beyond the control of the City as the lead agency, or the Project Applicant to guarantee. Implementation of mitigation measure MM NO-7.1, would require access all potentially affected residential units at the identified location outside of the Project site, performance of noise measurements and other tests within these private residential units, installation of structural noise attenuation features and verification of the effectiveness of the installed noise attenuation features during football games and concerts at the proposed Stadium. Further, installation of such noise attenuation features may not be practicable or possible at all locations due to the age and integrity of the residential structures as noted under Impact NO-6. Therefore, as the ultimate feasibility and practicality of mitigation measure MM NO-7.1 cannot be guaranteed at this time, noise impacts from football games and concerts this impact would be considered as significant and unavoidable.

Impact NO-8: Exposure of Persons to Excessive Noise Levels

Impact NO-8 **Implementation of the Project would not expose residents and visitors to excessive noise levels from flights from San Francisco International Airport such that the noise would be disruptive or cause annoyance. (Less than Significant) *[Criteria I.e, I.f]***

The Project would not expose people living or working on site to excessive noise from commercial aircraft overflights associated with SFO operations. As shown on Figure III.I-3, the Project site is well outside SFO's existing 65 dBA CNEL contour and is expected to remain outside this contour for the foreseeable future, which the FAA regards as an impact threshold for noise-sensitive land uses (i.e., residential). Although the Project site is under some of the main aircraft approach and departure tracks, these flights all pass over the site at considerable altitude. The typical SEL associated with such overflights (as observed during the football game noise measurements conducted at Candlestick Park) would be in the low 70s dBA. Given the 20 to 30 dBA of acoustic insulation that would be typical for the new residential uses that would be built as part of the Project, the expected daily/nightly sleep disturbance probability in the residential interiors would be very low even with the relatively large number of daily flight operations typical for SFO. Additionally, a review of *Airport Director's Reports* from the past 6 months indicates that no complaints were received from BVHP neighborhood residents regarding aircraft noise. Therefore, this impact would be considered less than significant. No mitigation is required.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts with regard to noise and vibration is limited to the immediate vicinity of the Project. This is due to the dissipation of noise and vibration with the increase of distance between receptors and noise sources. Noise impacts from cumulative development in the Project area can be largely attributed to an increase in vehicular traffic that is generated by the development both within and in the immediate vicinity of the Project, as well as noise generated from the use of the proposed stadium as included in the Project. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. The noise assessment relies on the future transportation projections, which reflect the traffic Project and reasonably foreseeable background growth and development within the study area as

well as modeled noise from stadium activities. Therefore, the analysis as conducted in Section III.I covers both Project-specific and cumulative impacts.

Construction activities include pile driving, which can reach levels up to 107 dBA L_{eq} at existing residential uses in the Project vicinity, and because these activities would be periodic throughout the 20-year construction phasing, thereby noticeably increasing ambient noise levels likely resulting in human annoyance, construction-related temporary increases in ambient noise levels would be considered significant and unavoidable. As discussed in Section III.I, construction activities would implement noise attenuation measures including, but not limited to, limiting the hours when pile driving can occur to the daytime (i.e., 7:00 A.M. to 8:00 P.M.) and the utilization of noise blankets, which could reduce noise levels up to 10 dBA. Although the implementation of mitigation measures would reduce the noise levels associated with pile-driving activities and limit the time of day that the noise could occur, it would not be reduced to a less-than-significant level. Therefore, because pile-driving activities would be periodic over a 20-year period, and may overlap with other nearby construction activities during Project development, construction-related temporary increases in ambient noise levels would be considered cumulatively significant and unavoidable.

After construction is complete, Project operation would create a substantial, permanent increase in traffic noise levels that would affect existing and future residential uses along all Project site access roads. These noise increases, as modeled on ten of the major site access roads, are expected to raise ambient noise levels by between 3.5 dBA L_{dn} to 9.8 dBA L_{dn} above the existing ambient levels, as shown in Table III.I-18 (Modeled Cumulative Traffic Noise Levels along Major Project Site Access Roads).

Table III.I-18 Modeled Cumulative Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*Cumulative Increase*	*Allowable Increase*	*Significant Cumulative Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	7.6	5	**Yes**
3rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	**5.5**	2	**Yes**
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	4.5	3	**Yes**
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	5.3	3	**Yes**
Ingalls Street north of Carroll Avenue	Residential	56.7	61.7	63.1	6.4	3	**Yes**
Carroll Avenue east of 3rd Street	Commercial	**52.6**	**53.8**	**58.1**	**5.5**	5	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**6.9**	3	**Yes**
Jamestown Avenue north of Harney Way	Residential	**51.4**	**55.5**	**61.2**	**9.8**	5	**Yes**
Harney Way west of Jamestown Avenue	Residential	52.6	59	59.6	7.0	5	**Yes**
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	**3.5**	1	**Yes**

SOURCE: PBS&J, 2009.

In addition, the operation of the stadium for both football games and concerts are anticipated to result in increases of ambient noise levels during these events that would be up to 9 dBA L_{dn} above the existing ambient levels at locations near the proposed Stadium, and at lesser but audible levels at distances at least within 2 miles of this facility.

Conducting the acoustic studies and implementing their recommendations as proposed above could not guarantee that either traffic and stadium event noise impacts would be reduced to an individually less-than-significant level. Further, at many noise-sensitive locations in the project site vicinity, traffic noise, stadium event noise and noise from other sources identified above would be additive. Thus, project operational noise from each identified sources category would be cumulatively considerable and their collective impacts would be cumulatively significant and unavoidable.

As with their noise impacts, the pile-driving activities during construction have the potential to cause vibration effects that would be considered significant. Due to the construction phasing, it is possible that pile driving and other heavy construction equipment would operate on multiple sites and collectively result in vibration impacts in excess of 85 VdB at nearby sensitive receptors Implementation of Best Management Practices could reduce the severity of potential impact, but could not guarantee a less-than-significant level. Therefore, impacts for vibration from the 20-year construction schedule would remain cumulatively significant and unavoidable.

Vibration sources anticipated with the operation of the Project could occur from trucks, buses, and light-rail vehicles entering the Project site. These vehicles would not be expected to exceed 85 VdB FTA threshold individually nor collectively act to produce an exceedance of this threshold. Also, there are no substantial fixed sources of groundborne vibration included as part of Project development; therefore, impacts from operational groundborne vibrations are anticipated to be cumulatively less than significant.

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SECTION III.J CULTURAL RESOURCES AND PALEONTOLOGICAL RESOURCES

III.J.1 Introduction

This section examines the potential impacts of the Project on cultural and paleontological resources. Cultural resources consist of prehistoric and historical archaeological resources, and buildings and structures of historic value. Paleontological resources are the fossilized remains or impressions of prehistoric plants and animals used to document the existence of extinct life forms and to reconstruct the environments in which they lived. This section identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts.

- The cultural resources section is based on the following technical studies: *Historical Context for the Archaeology of the Bayview Waterfront Project*,[228] San Francisco, California, November 2008;[229] *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project*, San Francisco, California, November 2009, and Addendum, March 2010;[230] *Historic Context for the Bayview Waterfront Plan*, July 2009;[231] the *Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Historic Resources Survey and Technical Report*, October 2009;[232] *Historic Resource Evaluation for Candlestick Park Sports Stadium, San Francisco*, April 2010;[233] and *Memorandum on Comparative Rarity of World-War-II Era Buildings at Hunters Point Shipyard*, April 2010.[234]229b The technical studies incorporate archival research, site reconnaissance, and interviews with public agency staff and other informed contacts. The paleontological setting is based on databases searches of the University of California Museum of Paleontology; the American Museum of Natural History, Division of Paleontology; the North American Mammalian Paleofaunal Database in July 2009; and a review by PBSJ of published studies by the US Geological Survey and other agencies and organizations to identify previously reported fossil finds in the vicinity of the Project site or in the same geologic units that occur at the Project site.[235] Ground surface reconnaissance and ground-disturbing activities to identify paleontological resources were deemed inappropriate at this stage of the investigation.

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[228] The prior name of the Project was the Bayview Waterfront Project. Some of the technical studies completed for the Project use the former name if they were prepared prior to August 2009; however, regardless of name, the reports address conditions at the Project site.

[229] Archeo-Tec, *Historical Context for the Archaeology of the Bayview Waterfront Project, San Francisco, California,* November 2008. Archaeological reports are on file with the City, but are not available to the public.

[230] Archeo-Tec, *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*, November 2009, and *Addendum*, March 2010. Archaeological reports are on file with the City, but are not available to the public.

[231] Circa Historic Property Development, *Historic Context for the Bayview Waterfront Plan*, December 2008. (refer to Appendix J1 [CIRCA, *Historic Context Statement*, July 2009]).

[232] Circa Historic Property Development, *Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Draft Historic Resource Survey and Technical Report*, October 2009. (refer to Appendix J2 [CIRCA, *Historic Resources Survey*, October 2009]).

[233] Circa: Historic Property Development, *Historic Resource Evaluation for Candlestick Park Sports Stadium, San Francisco, CA*, April 2010 (refer to Appendix J3 [CIRCA, *Historic Resources Evaluation for Candlestick*, April 2010]).

[234] Circa: Historic Property Development, *Memorandum on Comparative Rarity of World-War-II Era Buildings at Hunters Point Shipyard*, April 2010 (refer to Appendix J4 [CIRCA, *Rarity of HPS Military/Industrial Buildings*, April 2010]).

[235] Websites and publications used in preparation of the paleontological portion of this chapter of the EIR are cited throughout the text of this chapter.

III.J.2 Setting

Prehistoric Context

Until the late 1980s, the greatest concentration of documented prehistoric sites in San Francisco was in the Hunters Point-Bayview-Candlestick Point area. Dominant assumptions during this time were that San Francisco had a low prehistoric site density and that this was the result of either sparse prehistoric occupation or of modern destruction of prehistoric deposits. It was also assumed that prehistoric sites in San Francisco were virtually restricted to the Bay littoral with a few temporary food procurement camps along the coast. In the last twenty years, prehistoric sites have been discovered in San Francisco with unexpected frequency and with locations, depths, age, range of types, and an abundance that was not foreseen. New research tools (such as geoarcheology and Geographic Information Systems) have been employed in the study of these recent sites that have resulted in better predictability of vertical and horizontal site locations and new comparative interpretations of shell middens have resulted in a greater understanding of the complexity of construction and site-interrelationships of San Francisco Bay Area shell midden sites. Very little is known of the prehistoric sites in southeast San Francisco as they have been subject to almost no field investigation since Nels Nelsen first surveyed them in the early 1900s. Because of their poor documentation, prehistoric sites of the Hunters Point-Bayview-Candlestick Point area have an unclear relationship to the better-researched, more recently known concentration of San Francisco prehistoric sites in the South of Market Area of San Francisco.

Indigenous Peoples: the Archaeological Record

There are currently around fifty documented prehistoric sites in San Francisco. These prehistoric sites include several large settlement sites (inhabited up to 1,000 years), cemeteries, food-procurement camps, tool workshops, and historic-period Indigenous sites. One Indigenous site has been dated to nearly 6,000 years before the present and lay 75 feet below the surface. In contrast to prehistoric shell mound sites found elsewhere in the Bay Area, many shell mounds discovered in San Francisco have remarkable integrity because they have been buried for several hundred years beneath native sand dune deposits, enabling the study of their use and significance in the final periods before their abandonment. The high density and number of prehistoric sites in San Francisco provide the opportunity to study them as regional and sub-regional systems. In the light of field investigations and new theoretical approaches, it is now known the prehistory of the Bay Area was not one of slow uniform evolution but, rather, was punctuated by radical large-scale changes. The newer picture of San Francisco Bay Area prehistory indicates:

- Prehistoric sites sometimes occur in clusters with a primarily symbolic association with a focal shellmound of greater size and age
- The importance of the primary shellmound may have been in the form of religious/funerary observances and burials even after its abandonment
- Bay Area prehistoric shellmounds may have been planned, intentionally re-created structures (not merely inadvertent dietary refuse accumulations)
- Prehistoric shellmounds were sometimes constructed over pre-existing cemeteries
- Many Bay Area shell mounds were abandoned over the course of a relatively brief period

It is known that humans have been present within the urban area now known as San Francisco for at least 6,000 years and within the greater Bay Area for a period of time nearly twice as long. As prehistoric sites beneath the Bay and ocean floor or buried beneath late Holocene sand dune deposits are investigated in the future, the advent of local human prehistory may be pushed back even further in time. The earliest peoples currently known to have inhabited the San Francisco Bay Area were comprised of widespread but sparse populations of hunter-gatherers whose subsistence was based on large game, seeds, and nuts as evidenced by the presence of large projectile points and milling stones (*manos* and *metates*). These peoples lived in small nomadic bands that made less use of shoreline and wetlands resources than later prehistoric populations. Soon after 2000 B.P. (years before present), bayshore- and marsh-adapted people who were Utian language (Miwok-Costanoan language family) speaking people began to migrate into the Bay Area from the Central Valley, displacing the earlier Hokan language speaking populations. The new inhabitants were different than the older resident populations in a number of respects, including language; larger and more sedentary settlements; a subsistence based on acorns; shellfish and small game; and mortuary practices; personal ornaments; and perhaps the fabrication of coiled basketry. It is assumed that the Costanoan representatives of this Utian dispersal reached the northern end of the San Francisco peninsula no later than 500 B.C. (before Christ).

Early Holocene (11,000–8,000 B.P.)

There are few human sites in San Francisco Bay Area dating from this period and none have, as yet, been documented in San Francisco. Populations from this time probably lived in small groups that migrated frequently in accord with the annual patterns of preferred game and plants. Early Holocene sites may contain handstones, milling slabs, cutting and scraping tools, bifaces, dietary remains, or human burials.

Middle Holocene (8,000–4,000 B.P.)

The earliest evidence for human occupation in the San Francisco is roughly 6,000 B.P. The earlier focus on big-game hunting shifted to gathering a wider array of food resources, especially plants and seeds, during this period. Groups moved seasonally to different environments to use resources as they became available. The greater reliance on seeds is reflected in the kinds and number of artifacts recovered from sites dating to this period such as relatively large numbers of grinding tools. Investigations at sites located in Santa Clara County, indicate that during this period acorns became increasingly relied upon for food. Sites dating to this period tend to be deeply buried.

Late Holocene (4,000–230 B.P.)

Nearly all the prehistoric sites discovered in San Francisco are Late Holocene sites. Almost no dating, and no definitive dating, of prehistoric sites in the Hunters Point-Bayview-Candlestick Point area has occurred. Some of the prehistoric deposits in the southeast part of San Francisco may prove to be earlier than the Middle Holocene period.

During this period, there was a general trend throughout California for groups to adapt to local environmental conditions. Shellmounds are the dominant type of site in the Bay Area that date to this interval, and over 400 shellmound sites from this period have been recorded in the Bay Area. Shellmounds are typically found near or along the open Bay and next to streams flowing into the Bay. Artifacts often found in shellmound sites include stone net sinkers used to weight nets down, mortars and pestles for

grinding seeds and other plant material, bone tools manufactured from faunal remains, rectangular shell beads, stone arrowheads, and stone knives.

Four prehistoric sites are known or believed to be located within the Project site. All are reported as likely shellmounds or shell midden (an archaeological deposit which may contain copious amounts of mollusk shell in addition to stone debris from tool manufacture, animal bone, plant material, and other artifacts associated with past human occupation). The sites were originally documented in the early 1900s; however, since that time the Project site has been extensively developed. Disturbances to natural and man-made landmarks which were used to locate the sites have vanished, and today the exact site locations are unknown.

Previous archaeological investigations in San Francisco have located large intact cultural deposits likely dating to the 4000 to 230 B.P. period. Those substantial deposits are located deep below the modern surface. It is possible that conditions are similar in the Project site. It is, therefore, likely that some significant portion(s) of the four sites known or thought to be within the Project site are located deep beneath the present ground surface. It is also possible that an undiscovered prehistoric site could be encountered during Project-related construction activities. The last interval (post 230 B.P.) is considered the ethnographic period and is discussed below.

Indigenous Peoples: the Ethnohistorical Record

Attempts to understand indigenous peoples and reconstruct their way of life scientifically and interpretively through the written, cartographic, and pictorial documentary record provides a relatively reliable knowledge of indigenous peoples from the late Holocene Period to the present. To an important extent, this documentary record is based on recorded late nineteenth and early twentieth century "reminiscence" accounts of indigenous existence prior to the late eighteenth century missionization in the Bay Area.

Ethnography

The Project site lies within the traditional territory of the indigenous Ohlone (Costanoan) people. The northern tip of the San Francisco peninsula was once within the *Yelamu* tribal territory.[236] The *Yelamu* were one of a number of smaller tribal groups within the larger Ohlone language family. At the time of European contact, Ohlone lived in extended families which traced descent through the male line. Families were organized into clans, and they in turn essentially divided all members of the social structure into one of two groups—in this case the Bear and the Deer.

The staple food for the Ohlone people in the Bay Area was the acorn. Acorns were pounded into flour using a stone mortar and pestle, leached of tannic acids, and made into a mush or bread. Buckeye was also eaten and prepared similarly to acorns. Other plant species that were used include a variety of berries, roots, shoots, and seeds from wild onion, cattail, wild carrot, tarweed, chia, and many others. Controlled burning of land was practiced to help ensure future wild plant harvests. Clams, ocean and bay mussels, and oysters were also important components of the diet. Other sources of protein included various game birds, waterfowl, and large terrestrial and sea mammals.

[236] Milliken, Randall T. *A Time of Little Choice: the Disintegration of Tribal Culture in the San Francisco Bay Area, 1769–1810*, (Ramona: Ballena Press, 1995), 61.

Tules were used for material to make structures and watercraft. Balsa canoes were used to hunt waterfowl, fishing, and probably hunting sea mammals. Canoes were also used for travel and trade across the Bay and salt marshes. Fiber from plants were used to make a variety of basketry forms including cooking containers, utensils, storage containers, seed beaters, water jugs, cradles, fish traps, and burden baskets. Animal bones were used to make awls, pins, daggers, scrapers, knives, and other tools. Pelts and feathers were used for clothing, sinew for bows, and feather, bone, and shell for several different kinds of ornamentation including beads, pendants, hair bangles, septum inserts, and earrings. Local and imported stone and minerals were used to make a large number of tools. Local commodities used in trade included cinnabar (red mercury sulfide or native vermillion), hematite (the mineral form of an iron oxide), salt, shellfish meat, and shell for ornament manufacture.

As noted above, the Costanoan tribe that occupied the northern end of the San Francisco peninsula in the late eighteenth century is known under the general term *Yelamu*. The *Yelamu* were divided into three semi sedentary village groups. The *Yelamu* were composed of at least five settlements (*Chutchi*, *Sitlintac*, *Amuctac*, *Tubsinte*, and *Petlenuc*) that were located within present day San Francisco. *Yelamu* may have also been the name of an additional settlement within the vicinity of Mission Dolores. *Sitlintac* may have been located on the Bay shore near the large tidal wetlands of the Mission Creek estuary. *Chutchui* was located near the lake (*Laguna de los Dolores*) east of the current Mission Dolores, two to three miles in-land. These two villages were probably the seasonally settlements of one band of the *Yelamu* who used them alternately. Another *Yelamu* band seasonally used the village sites of *Amuctac* and *Tubsinte* that were located in Visitation Valley. *Tubsinte* may prove to be identified with CA-SFR-7, west of Candlestick Point, or the Ralston Mound, in Visitation Valley. No late period deposits have been investigated at CA-SFR-7 and the Ralston Mound has not been scientifically field investigated. A third *Yelamu* band, the *Petlenuc*, may have had a small settlement near the Presidio. The *Yelamu* were allied by marriage to Costanoan groups on the east side of San Francisco Bay.

Within less than two months after the Spanish began construction of the first Mission Dolores in 1776, all of the *Yelamu* villages in San Francisco were attacked and burned by an expedition sent by the *Ssalson* tribe, the Costanoan tribe of the San Mateo area. The *Yelamu* survivors abandoned all of the San Francisco settlements, seeking refuge with other groups in the East Bay and Marin. Until they were missionized in the late eighteenth century, the *Yelamu* only returned to San Francisco for occasional hunting. Prehistoric Costanoan and/or pre-Costanoan peoples may have maintained settlements or specialized activity sites (shellfish processing, hunting blind, ritual, burial sites) within the Project Area.

Historic Context

Overview

No occupation or use of the area within the Project site has been documented for the Hispanic and Early American Periods (1776–1848). However with the initiation of the Gold Rush in 1849 and subsequent statehood a year later, San Francisco's population and geographic area grew rapidly over a short period of time. The area around the entrance to San Francisco Bay was planned for more intensive development while the Bayview-Hunters Point area remained primarily pasture land.

Settlement in the Project vicinity during the 1850s and 1860s was primarily limited to the area just north of the Project site in India Basin, where northern European boat builders established small family

boatyards. From the 1880s through 1910, this area was the center of design and construction of scow schooners of which the Bay Area scow schooner represents a specialized region type. Drydock development (an uncommon ship construction facility type in San Francisco) also began by the late 1860s and continued until the early 1900s.

On Hunters Point, Italian and Chinese farmers moved into the area to grow vegetables for the growing City center located four miles to the north. Known as "truck farming," these agriculturalists grew fruit and vegetables on small plots of land and then carted their product to the urban markets to sell. By the turn of the century, the Italians dominated this industry, but as the century progressed agricultural endeavors within the area began to decline. The Chinese also began to establish fish and shrimp farms along the Hunters Point; these will be discussed in more detail in the Historic Context Themes section.

Some progress toward attracting further settlement was achieved with the construction of the Bay View Park racetrack in 1863 and Long Bridge in 1865.[237] Despite this an overall lack of established roads, access to the interior of the Project site remained difficult in the early years of settlement. Nevertheless, favorable weather and fresh water access enticed real estate speculators to the area during the 1860s as well.

One of the earliest real estate partnerships was between Jose Bernal's family and two land speculators, John Townsend and Corneille de Boom. Townsend and de Boom convinced Bernal to subdivide the land located at Hunters Point into lots and call the new homestead "South San Francisco.[238] To sell this idea, two brothers Robert Eugene and Philip Schuyler Hunter were brought in from the east coast. Despite the abundance of underground fresh water, well-made plans, and abundant advertising, the area was simply located too far from the city center to be viable. Despite the failure of the real estate venture, The Hunter brothers (for whom the area is named) stayed at Hunters Point as a pioneering family operating dairy and gardening ventures. They also sold spring water to ships from around the world by leasing water rights to the Independent Water Company.[239] The Hunter family occupied the area until they sold it in the 1870s.

Although some further early homesteading attempts in the Project site enjoyed modest success, by the early 1900s most of the area was still fairly open. The population was still predominantly Italian, with a fair number of Irish, Maltese, Portuguese, and Chinese settlers. These ethnic groups formed small enclaves within the larger community, sponsoring their own churches and social clubs. In the aftermath of the 1906 San Francisco earthquake and fire, Hunters Point, which was spared from the worst of the disaster, became an area of respite from smoke, chaos, and debris.

The Southern Pacific Railroad finished the Bayshore Cutoff in 1908, opening a direct rail line to the area. The railroad eventually included a 4,110-foot bridge over Islais Creek north of Custer Streets between Islais and Tulare Streets. While general access to the area had steadily improved, there were still impediments to industrial and residential development that had yet to be adequately addressed. The biggest problem was topography.

By the mid-1920s, the character of the Project vicinity started to shift from a mix of industrial and pastoral uses to a more organized urban environment. However, the boatyards, drydocks, greenhouses, and farms in the Project vicinity continued to dominate the landscape and shape where people settled. By the 1930s, City

[237] Archeo-Tec, *Historical Context for the Archaeology of the Bayview Waterfront Project, San Francisco, California*, p. 49, 2008.
[238] Ibid, p. 43.
[239] Ibid, p. 44.

government officially recognized Hunters Point as a separate district. In 1939, after fighting for years for paved streets, parks, sewer-line extensions, and public transportation, residents near the India Basin boatyards formed the Hunters Point Improvement Association to achieve needed community improvements.

Just prior to World War II, the Navy contracted with the drydocks at Hunters Point. The drydocks were expanded twice in response to the Navy's shipyard needs; the drydocks were one of the Navy's primary shipyard resources on the Pacific Coast. This eventually prompted them to purchase the Union Iron Works Dry Docks from Bethlehem Steel (the parent company of Union Iron Works) in 1939.

When the United States entered World War II at the end of 1941, the Navy had just completed its takeover of the drydocks at Hunters Point. From there, construction ensued for the next five years, dramatically increasing the dry landmass around the end of the Hunters Point and changing the topography of the entire area through reclamation efforts. Demands for housing for the defense workers at the shipyard resulted in the construction of over 12,000 housing units in the immediate area. Every portion of the Project site was affected by these housing projects. The population increase transformed the rural Bayview and Hunters Point neighborhoods into an urban center almost overnight. Demographic shifts from Italian to African-American predominance, economic shifts from agriculture to heavy industry, and social shifts from multigenerational families to transient settlers, all occurred during this highly tumultuous time.

After World War II, construction continued at Hunters Point Shipyard, but the number of jobs began to decrease. A sizable peacetime workforce was needed, but not in the around-the-clock fashion that was common during the war. The decrease in work prompted some families to leave the area.

The post-war period in San Francisco was marked by an extreme shortage of quality housing, especially for the low-income segment of population. Many of the temporary housing units built by the Navy around Hunters Point became apartment units managed by the San Francisco Housing Authority, transforming the area into the highest concentration of low-income housing in San Francisco. The history of the post-war period within the Project site is largely a story of the transition of this housing stock and its impact on the more well-established surrounding community. Due to the population shift described above, African-Americans remained the dominant ethnic group in the area and the main residents of area.

Historic Context Subareas

Candlestick Point

Candlestick Point was named after the long-billed curlew, a common shorebird locally known as the Candlestick Bird. Past uses in this area have included a quarry, a landfill, and a proposed site for a quarantine hospital.

In 1910, Candlestick Point was proposed as the site of a detention hospital for quarantining people with communicable diseases. The owners of the land opposed the project, and Candlestick Point was dedicated as a public park in 1915. During World War II, housing for families called Candlestick Cove War Dwellings was constructed. In 1954, a bond measure was passed to construct a major league baseball stadium, and by 1958 Candlestick Park Stadium was under construction. It was the first baseball stadium to be constructed entirely of concrete and was designed by John Bolles. John Bolles was a prominent Bay Area modernist architect whose other noteworthy designs include the 1959 Ping Yuen Annex housing project in Chinatown, Embarcadero Park, and the Bayview/Anna C. Waden branch library on Third Street. The

stadium was finished in time for the San Francisco Giants 1959 season. The Oakland Raiders played their 1961 American Football League season at the stadium. Candlestick Park has been home to the National Football League's San Francisco 49ers since 1971. Numerous expansions and modifications have been made to the stadium since it was built.

Prior to the construction of the Alice Griffith public housing, that site was occupied by the Double Rock War Dwellings. Constructed in the 1940s to house workers at the Shipyard, the "temporary" Double Rock War Dwellings remained occupied into the 1960s. In 1962, the San Francisco Housing Authority developed the Alice Griffith public housing to replace the war dwellings. At the time, Alice Griffith was one of the few SFHA sites that accepted African-American tenants, due to a neighborhood patterns policy that only allowed those of the predominate ethnicity of the neighborhood. This form of discrimination severely limited the locations where African-Americans could live in San Francisco.

Hunters Point

Shipyard Development

In 1885, President Cleveland's administration saw San Francisco Bay as second in importance only to New York Harbor for the nation's security. This view shaped the development in the Hunters Point area for most of the twentieth century. Expansion of military facilities in San Francisco during the first half of the twentieth century included Fort Winfield Scott (1912), Crissy Army Air Station (1921), Treasure Island (1941), and Hunters Point (1941). Many more were established throughout the East Bay and North Bay regions of the San Francisco Bay Area. San Francisco served as a primary shipbuilding and supply center, as well as one of the main westward points of embarkation throughout World Wars I and II.

What would become HPS began in 1864 as the brainchild of A.W. Von Schmidt, a German engineer. He approached the South San Francisco Homestead and Railroad Company, which was formed in 1862, with the idea that a drydock in such close proximity to their land would bring industry (and workers needing housing) to the area. They readily agreed and donated ten acres. However, financing for the construction was more difficult to secure. Eventually, Von Schmidt partnered with a number of investors, including William Ralston and Lloyd Tevis, to form the California Dry Dock Company. The drydock was largely cut from solid rock at the northeastern tip of Hunters Point. When it was completed in 1868, the California Dry Dock Company was well situated, with deep water and close proximity to the thriving scow schooner boatyards at India Basin.

At Hunters Point, the California Dry Dock Company operated through the end of the nineteenth century with limited government contracts and as a repair facility for Navy ships returning from the Pacific. Around 1901, the company changed its name to the San Francisco Dry Dock Company and commenced construction of a second drydock. Completed in 1903, the facility became the most modern drydock on the Bay.

In the meantime, the Navy further solidified its relationship with the Bethlehem Steel drydocks at Hunters Point. It subsidized construction of new, larger facilities at Hunters Point in exchange for prioritized access to the privately owned site. This arrangement enabled Bethlehem Steel to construct Drydock 3 in 1918, greatly increasing the ship repair capabilities at Hunters Point.

World War II

In response to escalating hostilities in Europe in the 1930s, the Navy purchased the Bethlehem Steel drydocks at Hunters Point in 1939. Improvements included a new assembly building just south of Drydock 2, a 50-ton crane, and an 800-foot quay wall[240] as well as smaller service- buildings. These projects were still under construction when the government terminated its lease to Bethlehem Steel in October 1941. The Navy took full control of the shipyard on December 18, 1941, just 11 days after the bombing of Pearl Harbor.

HPS was rapidly expanded and developed during the first years of US involvement in World War II. Dozens of buildings were constructed for various purposes for the war effort and beyond. Between 1939 and 1945 the shipyard was expanded from 48 acres to 583 acres. This major expansion included construction of a 1,092-foot drydock (Drydock 4), three 420-foot drydocks for submarines (5, 6, and 7 near India Basin), the leveling of a good portion of Hunters Point Hill, and the construction of dozens of buildings. The resulting 8 million cubic-yards of earth was used to fill in the Bay north and south of Hunters Point to create a submarine service area and a large flat area between Hunters Point and Yosemite Creek for future development, respectively.

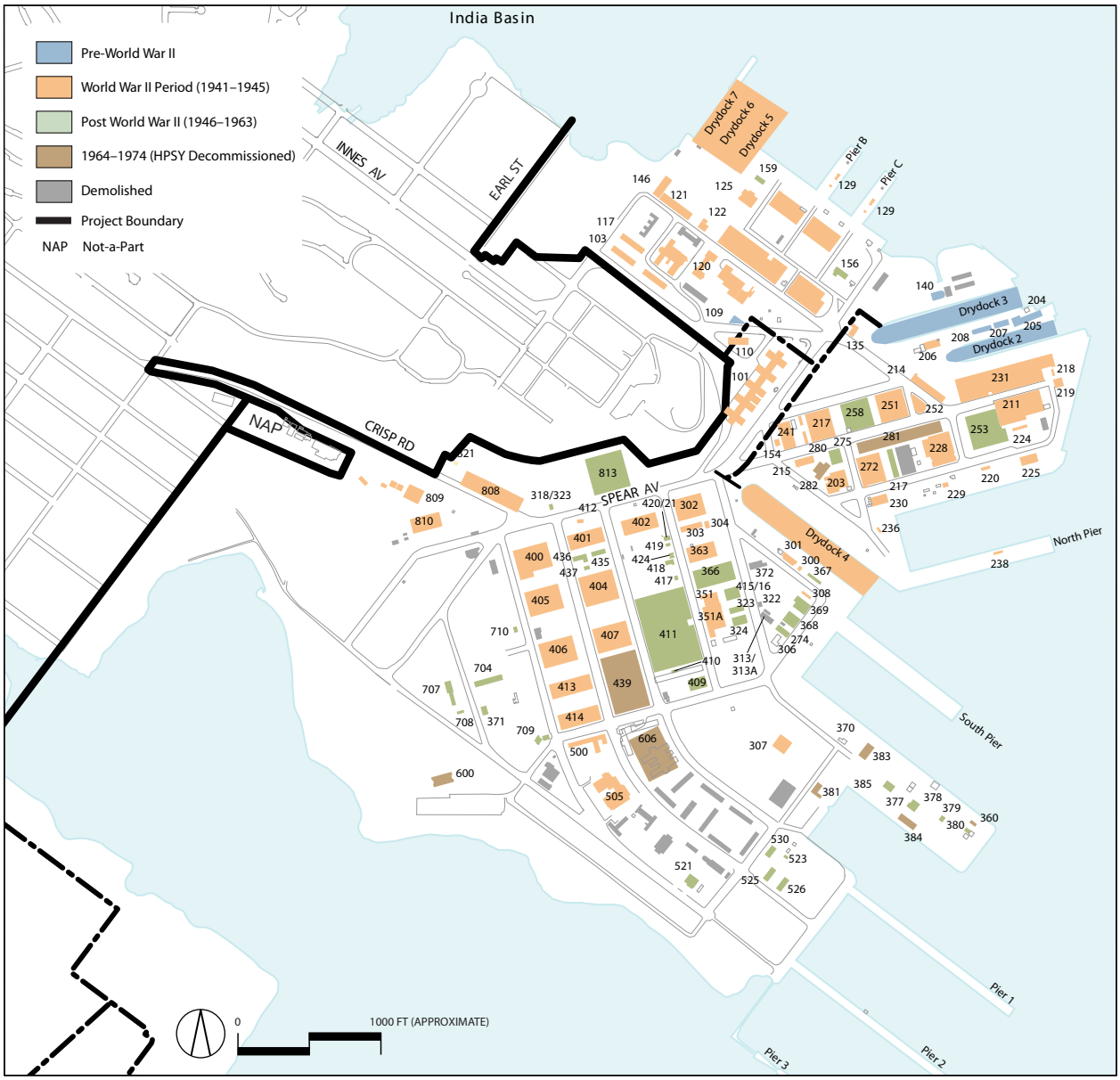
The first building built by the Navy in World War II was Building 231 (1942-1945), the Inside Machine Shop. Constructed in 1942 by the San Francisco-based firm of Barrett & Hilp and situated adjacent to Drydock 2, the curtain-wall building was for a brief period the only major functional shop at the Shipyard as the United States headed into the war. Building 211 was also one of the first erected by the Navy. The building was the original Shipfitters Shop and is a good representation of the typical semi-permanent, monitor-roof shop building constructed throughout the Shipyard during the World War II era. Building 224, a concrete air raid/bomb shelter building built in 1944, and later used as an annex for the NRDL, is a unique representative of its type at the Shipyard. The only building within the district completed after World War II is the Optical, Electronics and Ordnance Building, Building 253, finished in 1947 and attached to the west elevation of Building 211. This concrete frame curtain-wall building, designed for the Navy by local architect Ernest J. Kump, was a highly specific repair and research facility.

All of the construction was centered on the stated mission of HPS: "For all classes of vessels: interim docking, shaft and propeller repairs, repairs of major underwater damage; for carriers: interim overhaul of about three to four weeks comparable to overhaul by repair vessels afloat."

A numbering system was instituted during the war, and each series of numbers generally referred to a specific functional grouping of buildings (refer to Figure III.J-1 [HPS Phase II Structures]):

- 100s—Chiefly administrative buildings located near the Main Gate.
- 200s—Industrial shops and ancillary buildings
- 300s and 400s—Industrial and warehouse buildings
- 500s and 600s—Primarily residential
- 700s and 800s—Industrial support or storage buildings or Naval Radiological Defense Laboratory-related
- 900s—Officers Mess, greenhouses and garden sheds, a bank and garage facilities

[240] A quay wall is a wharf or bank that is constructed to accommodate the loading of ships and other vessels.



SOURCE: Treadwell & Rollo, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

HPS PHASE II STRUCTURES

FIGURE III.J-1

Buildings and docks remaining on HPS include:

- Building 101—Main Administration Building, Civilian Cafeteria
- Building 103—Submarine Barracks, Personnel Decontamination Center for Operation Crossroads
- Building 104—US Naval Reserve Training Center, Naval Reserve Armory, Submarine Barracks
- Building 109—Lincoln Restaurant; HPSY Police Station
- Building 110—Marine Barracks & Mess
- Building 113—Torpedo Storage & Overhaul/Tug Maintenance, non-destructive testing
- Building 115—"US Naval Reserve Drill Hall"; Submarine Training School
- Building 116—Submarine Applied Training School, Submarine Subsistence
- Building 117—Submarine Barracks
- Building 120—Canteen, Enlisted Men's Club
- Building 121—Submarine Offices, Apprentice School, Submarine Repair Shop, Administration building, Civilian Training Center
- Building 122—Substation "V" and Compressor Plant
- Building 123—Battery Overhaul & Storage; Substation "T"
- Building 125—"Submarine Cafeteria"
- Building 128—Substation "U", Work Control Center #1, Shop Services, Ship Repair Shop
- Building 129—Administration Building, Substation "U," Submarine Pier Office
- Building 130—Pipefitter's Shop, Shipbuilding & Repair Shop
- Building 132—Submarine Pier Office, Substation "U-1," Tug Crew Barracks
- Building 134—Outside Machine Shop, Diesel Overhaul, Quality Assurance Offices
- Building 135—Substation "G"
- Building 140—Pumphouse #3
- Building 146—Industrial Photo& Laboratory Building, Electronics Repair & Storage
- Building 154—Area time office #1, Administration Building
- Building 156—Rubber Shop, Pipefitters Shop Annex
- Building 159—Latrine
- Building 203—Powerplant—Substation "H", Oil fired heating plant, CROSSROADS ship fuel burn
- Building 204—Gate and Pump House, Salt Water Pumphouse
- Building 205—Drydock 2, Pump House, Compressor House, Substation "C"
- Building 206—Substation "A" & Compressors
- Building 207—Latrine
- Building 208—Self Service Canteen and Tool Room, Shop Service Building & Tug Parts
- Building 211—Electric Shop, Machinery & Electric Test and Repairs
- Building 214—Accounting and Bond Office, Admin. Annex, Radiography, Combat Weapons Systems Office, Cafeteria facilities
- Building 215—Fire Station #1/Hunters Point Fire Department
- Building 217—Sheet Metal Shop & Ship Repair Shop
- Building 218—Latrine
- Building 219—Substation "E"
- Building 224—Air raid shelter, NRDK Annex K
- Building 225—Shop Service Building, Work Control Center #2
- Building 226—Latrine
- Building 228—Central Cafeteria/Civilian Cafeteria

- Building 229—Substation "L"
- Building 230—Shop Service building, Machine Shop
- Building 231—Inside Machine Shop, Ship Repair Shop
- Building 236—Salt Water Pump House
- Building 238—office building on the North Pier
- Building 241—Boilermakers & Blacksmiths' Shop, Forge Shop, Ship Repair Shop
- Building 251—Storage & Issue Building, Electricians' Shop, Central Tool Room, Sheet metal shop
- Building 252—Bus Terminal, Golden Anchor Coffee Shop
- Building 253—Optical, Electronics and Ordnance Building; Optical, Ordnance & Radio Shop; Maritime Administration Ships Pars Storage; Radiography; Weapon/Electronics Shop; RADIAC; Instrument Calibration Laboratory; Storage of Parts from OPERATION CROSSROADS Ships
- Building 258—Pipefitter's Shop
- Building 271—Paint Shop Annex, Equipment Storage, Sandblast Facility, Paint Lab
- Building 272—Riggers & Laborers Shop
- Building 274—Decontamination Training Building, Office Space
- Building 275—Sheet Metal Annex,
- Building 280—Covered Sheet Metal Work Area
- Building 281—Electronics, Weapons, Precision Facility/Antenna Repair
- Building 282—Antenna Abrasive Cleaning Unit
- Building 300—Substation "N"
- Building 301—Latrine
- Building 302—Transportation Shop, Automotive Vehicle Maintenance Facility
- Building 303—Transportation Shop Annex
- Building 304—Service/Gas Station
- Building 306/306A—Substation "I"
- Building 307—Electronic Storage, Public Works Equipment Storage, Electronic Assembly
- Building 308—Salt Water Pump House, Fire Protection Pumping Station
- Building 323—Boat Shop, Shore Activities/Electronics
- Building 324—CO2 Refilling Station
- Building 351/351A—NRDL Annex E, Electronics Shop, Chemical Technical Development Branch, General Research Lab
- Building 360—Test building
- Building 363—Shipwrights & Joiners Shop, Woodworkers Shop
- Building 366—Boat Shop/Plastic Shop, NRDL Electronics Work Area, Radiography Shop, Chemical Research Lab
- Building 367—Work Control Center #3, Administration Building, Field Office
- Building 368—Shop Service Building #1 Ship Repair Shop and Pipefitting Shop
- Building 369—Shop Service Building #2 Ship Repair Shop and Pipefitting Shop
- Building 370—Latrine
- Building 371—Transportation Shop Annex, Automotive Shop Building
- Building 377—Work Shop & Poseidon Systems Test Engineering
- Building 378—Latrine
- Building 379—Instrumentation/Control—Poseidon Engineering
- Building 380—Work Shop & Poseidon Systems Test Engineering
- Building 381—Shock Test Facility

- Building 383—Poseidon Shipping and Receiving
- Building 384—Poseidon Engineering
- Building 385—Poseidon Engineering
- Buildings 400, 402, 404, 405, 406, and 407—Supply storehouses
- Building 401—Building trades shop/general warehouse, Public Works Shop
- Building 409/409A—Welder Motor Generator Building
- Building 410—Welder Motor Generator Building
- Building 411—Shipfitters, Welders & Boilermakers Shop; Ship Repair Shop; Civilian Cafeteria; Radiography
- Building 412—R.R. Scales
- Building 413—Supply storehouse, Cable storage building
- Building 414—Supply storehouse, Mold loft, radium storage area
- Building 415/416—Supply storehouse
- Building 417—Acetylene Manifolding Building
- Building 418—Metal Spray Building
- Building 419—Oxygen Converter
- Building 420—Oxygen Cylinder Charging
- Building 424—Area Time Office #4, Administration Building
- Building 435—Equipment Storage, General Warehouse
- Building 436—Paint & lumber storage
- Building 437—Pipe Storage, General Warehouse
- Building 439—Equipment Storage, Sheet Metal Shop
- Building 500—Barracks, Ship Officers' Bachelors Quarters, Ships Canteen, Laundry, NRDL Admin. Offices
- Building 505—Navy Exchange Building, Gymnasium, bowling alley, and canteen
- Building 521—Power Plant—South Area
- Building 523—Fire Protection Pump Station, Salt Water pump house
- Building 525—Pacific Reserve Fleet Supply Building
- Building 526—Pacific Reserve Fleet Repair Shop
- Building 527—Motor generator building on pier 2
- Building 530—Auto Hobby Shop
- Building 600—Bachelor Enlisted Quarters, E.M. Barracks
- Building 606—Police Station
- Building 704—Equipment holding shed, Radioactive Material Storage Area, Transportation Shop car shelter
- Building 707—Animal hospital medical building, NRDL annex, Animal colony, waste processing
- Building 708—NRDL Bio-med Facility/animal research, Animal psychology study colony
- Building 709—Navy Exchange Gas Station
- Building 710—Latrine
- Building 808—Industrial Storage building
- Building 809—Lumber Storage/Supply Storehouse
- Building 810—Paint & Oil Storage
- Building 813—Supply storehouse & office, general warehouse
- Building 819/823—Sewage Dump Station A (819), Storage Building (823)
- Building 821—NRDL research Animal facility/x-ray lab

- Various sheds
- Docks 2, 3, and 4—Drydock Operation, OPERATION CROSSROADS ship decontamination.
- Docks 5, 6, and 7—Ship repair (Submarine)

The Atomic Bomb and Nuclear Research

During World War II, HPS was at times used to load and outfit ships prior to embarkation. On July 15, 1945, the USS *Indianapolis* was docked at Hunters Point awaiting orders. On that date, components of the atomic bomb "Little Boy" were loaded aboard the *Indianapolis* for transport to the South Pacific. It was reported to have contained half of the available uranium in the United States. The ship left Hunters Pont at 6:30 the next morning but was held in San Francisco, awaiting the results of the first atomic weapons test in New Mexico. The test was a success and the *Indianapolis* sailed out of the Golden Gate at 8:30 A.M. and transported the bomb to Tinian in the Marianas Islands. On August 6, 1945, the bomber Enola Gay dropped "Little Boy" on Hiroshima, essentially ending World War II.

Nuclear weapons development was the impetus for the Navy's decision to research protection devices to shield soldiers and civilians from exposure to radioactivity. A nuclear research facility was developed at HPS beginning in 1944 due to its advantageous geographic, political, and logistical attributes. Called the Naval Radiological Defense Laboratory (NRDL), it became a leader in nuclear testing. "NRDL personnel were involved in all atomic weapons tests between 1950 and 1958, providing test support, primarily related to radiation safety and monitoring."[241] After 1951, the NRDL took over many of the buildings on the southern half of the shipyard. The NRDL closed in 1969. Other activities at the Shipyard declined in the 1960s and early 1970s, the Navy officially closed the shipyard in 1974. After 1976, most of the Shipyard was leased to Triple A Machine Shop, a private ship-repair operation. In 1986, the Navy reclaimed the Shipyard for the purposes of environmental remediation with the eventual goal of removing the property from federal ownership (refer to Section III.K [Hazardous Materials] of this EIR for a detailed discussion of the cleanup activities).

Historic Context Themes

Context themes provide a basis for the evaluation of resources and can be arranged either geographically or thematically. The two context themes below, Chinese Fishing Villages and Maritime History, represent important themes in the history of the Hunters Point related to extant resources.

Chinese Fishing Villages

The Chinese fishing villages played an important role in the history of Hunters Point and San Francisco Chinese community. Between the 1870s and the 1900s, Chinese fishing camps flourished in San Francisco and elsewhere around the Bay. Most of the fishing camps were started by workers who were out of work after the completion of the transcontinental railroad in 1869. The Chinese developed the shrimp fishing industry, created largely by the presence of shrimp at their fishing locations and the use of bag nets. Before the late 1860s fishermen caught a variety of fish. By the late 1860s, the Chinese shrimp fishing was a fully developed industry. A substantial amount of dried fish, abalone, abalone shells, and shrimp were exported to China.

[241] Circa Historic Property Development, *Historic Context for the Bayview Waterfront Plan*, p. 114, December 2008.

The amount of San Francisco fish and shrimp exported overseas led fishermen of other ethnicities to petition the State to levy taxes on Chinese commercial fishing. In 1885 and 1886, six hundred Chinese were arrested for tax reasons. The federal government revived old trade-laws and applied them to the dried fish and shrimp trade. Chinese vessels were seized and their captains fined.

The number of Chinese camps around the Bay decreased from 50 in the 1880s to 26 in 1896. The 1900 US Census lists one Chinese fisherman at Hunters Point, but there is no evidence of large-scale fishing camps in the area. The State Legislature outlawed the bag net in 1910, and most of the shrimp fishermen abandoned the industry. A redesign of the bag net, which permitted trolling for shrimp, was introduced in the 1920s. By the 1930s the empty fishing villages were again active. No fewer than twelve fishing camps were observed along Hunters Point shoreline.

In 1939, the San Francisco Health Department, responding to complaints about the pungent smell of the fishing camps, declared the camps unsanitary and ordered several of them burned. The fishing activity declined also because of Bay fill and pollution, and the movement of the Navy to Hunters Point in the 1940s. One camp, the Hunters Point Shrimp Company, closed as late as 1959.

Chinese fishing camps have been recorded at the Project site, primarily at Hunters Point. Although no known Chinese shrimp camps were located in the Candlestick Point area, this does not preclude the possibility that unidentified camps existed within that area. In contrast, fishing camps were widespread in at Hunters Point. Two possible locations for a fishing camp that dates to the 1860s have been identified in HPS.

The presence of Chinese fishing settlements in the Hunters Point area from the late nineteenth century to the mid twentieth century indicates that the Project site is likely to contain potentially significant archaeological resources. The archaeological resources would be the remnant cultural materials that would provide important information regarding the Chinese inhabitants of the Project site and the role of Chinese fishermen in the greater San Francisco Chinese community.

Maritime History

The Project site's shoreline with access to deep water became an early center for maritime activities. Small shipyards, crowded out of the waterfront closer to the City's center, began operating in and adjacent to the Project site as early as the 1860s. By the end of the nineteenth century, the Project site contained shipyards, a drydock, and other related enterprises along the northern shore of Hunters Point. Most of the boats built and repaired at Hunters Point were scow schooners (a boat with a broad, shallow hull instead of a deep keel), and two boatyards adjacent to the Project site in India Basin are known to have built junks (a boat with a flat bottom, no keel, and a very large rudder) for Chinese fishermen.

The drydock facilities at Hunters Point were the largest enterprise within the Project site in the late nineteenth century. The California Dry Dock Company constructed the first drydock in 1867. A second drydock was built in the early 1900s by the San Francisco Dry Dock Company. After the second dock was constructed, Navy ships came to the area for drydock service. In 1908, the Union Iron Works, a division of the Bethlehem Shipbuilding Company, purchased the operation from the San Francisco Dry Dock Company, which later became the Union Iron Works Dry Docks.

Paleontological Setting

The Project site is a rock and soil promontory in southeastern San Francisco extending east into San Francisco Bay. The ground surface in the waterfront area across the entire Project site is relatively flat with elevations ranging from approximately 0 feet to +20 feet San Francisco City Datum (SFCD). Maximum ground surface elevation in the Project vicinity is on Bayview Hill (west of Candlestick Point), approximately +400 feet SFCD. Alluvial, colluvial, and estuarine sediments of the Late Pleistocene and Holocene Epochs (less than one million years old) underlie much of the Project vicinity and were deposited in a structurally controlled basin (San Francisco Bay) as the basin as subsided. These sediments consist of estuarine deposits of older Bay mud, undifferentiated sedimentary deposits (interbedded freshwater and marine sand, clayey sand, and very stiff, lean clay containing shell fragments), younger Bay mud, and alluvial/colluvial deposits (slope debris of clay, sandy clay, sandy silt, sand, silty gravel, etc.), all of which rest on a variety of deformed and metamorphosed bedrock types associated with the Franciscan Complex of the Early Cretaceous Period (between 97 million and 113 million years old in the vicinity of the Project site). Section III.L (Geology and Soils) includes detailed descriptions of the soils and rock units.

Fossils are typically found in river, lake, and bog deposits, although they may occur in nearly any type of sedimentary sequence. The predominant rock types at the Project vicinity are chert, shale, and greenstone in the Candlestick Point area adjacent to the Bay and serpentinite, chert, sandstone, and shale in the HPS Phase II site. Although uncommon in the low-grade metamorphic Franciscan rocks, fossils from widely scattered localities have been important in sorting out the depositional history of the Franciscan Complex. A Cretaceous ammonite was found in Franciscan shale in northeastern San Francisco, as were fossil plant remains (usually reported as carbonaceous matter or carbonaceous particles and layers), and thin shells resembling parts of arthropods. Tiny shark's teeth are the only known vertebrate fossils reported from the Franciscan Complex.

The undifferentiated Late Pleistocene sediments may include deposits of the Colma Formation which contains marine and terrestrial fossils including bones and teeth of mammoth and extinct bison and ground sloth, juniper and red cedar. Holocene pollen, plant, and shell fossils have been reported in the Bay mud. Remains of land mammals (extinct mammoth, bison, and horse) have been reported from localities in younger alluvium along the bay margin south of the Bay Bridge San Francisco Anchorage. No fossils have been reported from artificial fill in the San Francisco Bay area.

Expected Cultural and Paleontological Resources

Prehistoric Resources

Sixteen prehistoric archaeological sites are located in or within a quarter-mile of the Project site. These include CA-SFR-3, CA-SFR-7, CA-SFR-8, CA-SFR-9, CA-SFR-10, CA-SFR-11, CA-SFR-12, CA-SFR-13, CA-SFR-14, CA-SFR-15, CA-SFR-16, CA-SFR-17, CA-SFR-18, CA-SFR-110, CA-SFR-124, and the Thomas-Hawes Mound.

Site CA-SFR-7 (Bayshore Mound, Johnson Landing Mound) has been determined to the eligible for the National Register of Historic Places (NRHP). Excavations performed in 1910 at CA-SFR-7 yielded several human burials. The site was subsequently heavily disturbed and material from the site used to fill a nearby

marsh. Recent auger testing conducted in 2008 indicates that despite the prior disturbance of the site, significant portions of the site still exist underneath fill material. Site CA-SFR-17 was first excavated in 1931 and it also contained several human burials. This site was covered by fill material soon after excavation efforts. The site area was later archaeologically tested in 1987 with auger bores. This testing found that the topmost portion of the site was still intact and was buried 12 to 16 feet below the modern surface. The deposit was in places eight feet thick and extended over an area 650 feet long and 200 feet wide. Site CA-SFR-17 has been determined to be potentially eligible for the NRHP. CA-SFR-110 was located underneath Griffith and Revere Streets. The top portion of the shellmound had been leveled by development, but the remaining deposit was from four to seven feet thick and buried under eight to ten feet of landfill. The site measured approximately 400 feet long and extended halfway between Shafter and Thomas Streets.

One of the sixteen sites, CA-SFR-124, was discovered during monitoring for the Bayview Extension of the Auxiliary Water Supply System in 1990.[242] The site consisted of a shell midden and measured 205 feet long and extended on both sides of Lane Street. The deposit was relatively thin, at most only one foot thick. It was also shallow, on average only six inches below roadbed material. This site may have been re-deposited from another area during historic times. Trench profiles showed the prehistoric deposit overlain old utilities pipes as well as a fill deposit that contained historic-era artifacts. The researchers noted, however, that intact deposits probably were present west of Lane Street.

Since the bedrock is shallow and close to the surface in the Candlestick Point area resources are also expected to be relatively shallow in areas formerly on land. The northern areas of the site are above sea level (+15 feet above San Francisco City Datum), and the historic and recent prehistoric surface has not been significantly altered. In the early twentieth century, Nels C. Nelson found and excavated prehistoric site CA-SFR-9 at Candlestick Point in the area that is now the stadium; however, the extent of the excavation is unknown. The southern area of the site, which was submerged beneath Bay waters during the historic era, is covered with fill. Before filling, the Bay in this area was relatively shallow, less than 10 feet below sea level. Thus, the highest potential for intact cultural deposits is below the fill and above the original Bay floor. It is also possible that prehistoric resources may have been removed from their original location and may be found within fill deposits in the southern (southeastern) area of the site.

The waters of the San Francisco Bay originally covered all but the northernmost portion of HPS during the later nineteenth and early twentieth centuries. In the northern upland portion of the Shipyard, the bedrock is shallow and is close to the surface. Before filling, the Bay floor was much shallower in the northern portion (near the original Hunters Point peninsula) than in the southern portion. In areas originally underwater, the area of the highest sensitivity ranges from about 20 feet (closer to northern portion) to about 60 feet (southern portion) below present ground surface.

- Based on archival research, the following indigenous sites are known or are believed to be located within the boundaries of the Project site. Some sites have not been evaluated for eligibility for listing on the California Register of Historic Resources (CRHR) or National Register of Historic Places, since most are

[242] Holman & Associates, *Report on Archaeological Monitoring of the Bayview Extension of the Auxiliary Water Supply System and Observations on CA-SFR-124, a Shell Midden Deposit at Lane Street and Shafter Avenue, Bayview District, San Francisco, California*, Rohnert Park, CA: Northwest Information Center, 1991.

under fill or on areas that have been developed. However, if a site or portion of a site contains intact archaeological deposits it would be considered a significant archaeological resource.[243]

- **CA-SFR-7**

Site CA-SFR-7, as described above, has been determined to the eligible for the National Register of Historic Places (NRHP). The site is at the western end of Candlestick Point.

CA-SFR-9

Site CA-SFR-9 has been identified with Nelson's Site #389.[244] The site record provides no description, but suggests it was probably a shell midden. The San Francisco Major Environmental Analysis (MEA) Shellmound Data Base indicates that it was located at the east end of Candlestick Point approximately 0.375 mile northeast of CA-SFR-7.[245]

CA-SFR-12

Site CA-SFR-12 is a shellmound, recorded by Nelson as Site #391 on the south side of Hunters Point.
- More recently, Hamusek-McGann et al. used an archaeological predictive model to identify the likely location of the site in HPS.[246]

CA-SFR-13

Recorded by Nelson as Site #392, site CA-SFR-13 may be located at the eastern end of Hunters Point.[247]
- More recently, Hamusek-McGann et al. used an archaeological predictive model to identify the likely location of the site in HPS.[248] Hamusek-McGann et al. report that based on historical maps the probable location of this site would have placed it at the original shoreline where Drydock 4 was later built. Due to extensive excavations that occurred during construction of the drydock Hamusek-McGann et al. assume that CA-SFR-13 was destroyed; however, as with other sites that were later determined to be wholly or partially intact, such as CA-SFR-7, CA-SFR-17, and CA-SFR-140, this site might also present intact discoveries.

CA-SFR-14

Site CA-SFR-14 is probably a mound, recorded by Nelson as Site #392a on the northeast end of Hunters
- Point. More recently, Hamusek-McGann et al. used an archaeological predictive model to identify the likely location of the site in HPS.[249]

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[243] An intact archaeological deposit is one in which the original or stratified association of archaeological remains are retained within an archaeological site.
[244] Nelson, Nels C., Shellmounds of the San Francisco Bay Region, *University of California Publications in American Archaeology and Ethnology*, 7.4 (1909): 310–357.
[245] MEA Shellmound Archeo GIS Project, *Candlestick Point & Hunters Point Shipyard Redevelopment Plan: Locations of Prehistoric and Historical Period Sites*, Unpublished report generated from the MEA Shellmound GIS Project, San Francisco Planning Department: San Francisco, 2007.
[246] Hamusek-McGann, B., Baker, C., & Maniery, M. 1998.
[247] Nelson, 1909.
[248] Hamusek-McGann, B., Baker, C., & Maniery, M. 1998.
[249] Hamusek-McGann, B., Baker, C., & Maniery, M. 1998.

CA-SFR-11

Site CA-SFR-11 is a shell midden recorded as Nelson's Site #390 on the south side of Hunters Point.[250] More recently, Hamusek-McGann et al. used an archaeological predictive model to identify the likely location of the site inside HPS.[251]

However, the MEA Shellmound Archaeo GIS Project map also places the site at another location—one immediately northeast of the Project boundary.[252] This appears to support Olmsted's original observation that the site Nelson designated as Mound #390 was situated on Palou Avenue near the shoreline.[253] The site appears to be in the western part of Hunters Point Shipyard Phase II.

Chinese Fishing Village Sites

The remains of many Chinese fishing camps may still exist within the Project site. Camps and villages at HPS date from 1853 up to the 1940s. Documents show that at least four camps containing a total of 206 fishermen existed in the 1860s; 2000 fishermen were on the Project site in the 1880s. Records are scant for the period between 1890s and 1910. This reflects a decrease in fishing. By 1910, the fishing industry returned, and five companies were known to exist. The 1920s saw a decrease to possibly three camps on the Project site. By the 1930s, the number of camps in the Project site attained its highest level, with at least 12 camps documented.

Camp locations would have included a range of domestic and work-related structures associated with the shrimp industry. Most camps followed a similar layout, although this would have changed over time as population, technology, and social conditions changed. Typically a camp consisted of several small shacks at the water's edge, a wharf, a processing area with boilers, drying grounds, storehouses, and living quarters. Since Chinese fishing camps were located near the Bay, the original shoreline and adjacent beach should be considered highly sensitive for these types of resources. Chinese fishing village sites at the Project site that contain intact archaeological deposits would be considered significant archaeological resources.

Maritime Sites

A variety of maritime-related resources are the most likely potential historic archaeological resources within the Project site, including boatbuilding and small craft repair facilities; large ship repair and drydock facilities; buried ships; and maritime-related waterfront infrastructure. Boatbuilding resources may include tools used to build and repair the ship; remnants of wood, metal, textiles, and rope used to build the ship; and discarded items related to the ship carpenter, ship laborers, and apprentices.

The California Dry Dock Company, later the San Francisco Dry Dock Company, operated a drydock facility at the tip of Hunters Point. Boarding houses built near the drydocks were frequented by sailors and passengers. It is possible that refuse from the drydock operations, its employees, ship crew, and passengers may exist beneath the modern fill. Drydock resources may include the dock, hardware related to the

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[250] Nelson, 1909.
[251] Hamusek-McGann, B., Baker, C., & Maniery, M. 1998.
[252] MEA Shellmound Archaeo GIS Project, 2007.
[253] Olmsted, Roger, et al. Research Design to Locate Nelson Shellmounds Subject to Impact by San Francisco Sewer Route 2 A-1; Olmsted, Roger, et al., *San Francisco Bayside: Historical Cultural Resource Study*, San Francisco: San Francisco Clean Water Program, 85, 1980.

construction of the dock, personal items, and refuse associated with boarding houses that were frequented by sailors and passengers while the ship was at dock.

Buried ship resources may include shipwrecks, abandoned hulks, and ships that were converted into residences during the 1930s. Numerous ships have been found buried in San Francisco, most of which were buried as the city's shoreline was extended during land filling operations. A search of the California State Lands Commission's online shipwreck database revealed six ships that wrecked in or in close proximity to Hunters Point. Fragments of these wrecks and their cargo may have washed ashore or used as landfill and may be buried within the Project site as the shoreline was filled in. Few shipwrecks that date to the nineteenth century have been archaeologically studied and documented. Most of the studies have involved only the portion of the wreck that was encountered or the bottom of the hulls. Documentation of complete vessels is extremely rare. Although these deposits may not be complete specimens or in their original location, remains of shipwrecks, abandoned hulks, and ship cargo may be able to answer important research questions relating to maritime trade, ship wrecks, abandonment, or reuse of the wreck.[254]

Waterfront infrastructure resources may include wharves, retaining walls, driven piles, ship-breaking yards, and hardware related to the construction of these resources.

Any sites that contain onshore or offshore maritime archaeological deposits that have the potential to adequately address research questions such as those presented in the Archaeological Research Design and Treatment Plan for the Project[255] would be considered significant archaeological resources.

Historic Resources

Candlestick Point

The Candlestick Point site does not contain historic resources. In 2007, Jones & Stokes completed a review of Candlestick Park stadium, built in 1960, for potential eligibility in the NRHP.[256] The evaluation determined that the stadium did not meet the criteria to qualify as an exceptional property less than 50 years old. The report noted extensive alterations since its construction, including the expansion and enclosure in 1970 and more recent modifications to convert the stadium into a football-only facility. A recent Historic Resource Evaluation (HRE) reviewed the stadium as a 50-year-old structure and the HRE concluded that, while the stadium would meet certain NRHP and CRHR criteria for association with events and persons, specifically the expansion of Major League Baseball to the West Coast and the career of Willie Mays with the San Francisco Giants, the stadium does not retain sufficient integrity to qualify as an historic resource under NRHP or CRHR criteria.[257] The Alice Griffith public housing site was evaluated as part of this EIR and determined ineligible for listing on the NRHP, CRHR, or City landmark registers because it was not strongly associated with a significant historical event, was not directly associated with Alice Griffith's productive life, is not distinctive architecturally, and does not have the potential to yield additional important historical information. No other potential historic resources have been identified in the Candlestick Point area.

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254 Archeo-Tec, *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*, 2009.
255 Ibid.
256 Jones and Stokes, *Final Historic Property Survey Report Bayview Traffic Improvements Project Caltrans District 4 San Francisco County,* California. 2007.
257 Circa: Historic Property Development, *Historic Resource Evaluation for Candlestick Park Stadium, San Francisco, CA*, April 2010 (refer to Appendix J3 [CIRCA, *Historic Resources Evaluation for Candlestick*, April 2010]).

Hunters Point Shipyard

The HPS Phase II site contains buildings and structures identified historic significance. Since Shipyard decommissioning in 1974, two studies evaluated historic resource at the Shipyard. In 1988, a report concluded that four properties were eligible for listing on the NRHP: Drydock 4; Building 253; the 450-ton Re-gunning crane, and the Hunters Point Commercial Dry Dock Historic District (including Drydock 2, Drydock 3, remnants of Drydock 1 and Buildings 140, 204, 205, and 207).[258] The Deputy State Historic Preservation Officer (SHPO) concurred with the findings of the 1988 report. In 1997, JRP Historical Consulting Services completed an updated report for HPS and concluded that Drydock 4 and the potential Hunters Point Commercial Dry Dock Historic District appeared eligible for listing in the NRHP. The JRP report concluded that Building 253 and the Re-gunning crane, identified in the 1988 study, were not eligible due to integrity issues. In 1998, the SHPO concurred with findings that the Drydock 4 and the potential Hunters Point Commercial Dry Dock Historic District appeared eligible for inclusion in the NRHP.[259] The Navy is currently completing National Register nominations and Historic American Engineering Records documentation for the Hunters Point Commercial Dry Dock Historic District, pursuant to the Memorandum of Agreement with SHPO and the Advisory Council on Historic Preservation, discussed under "Regulatory Framework," below.

- The Office of Historic Preservation Directory of Properties in the Historic Property Data File included Drydocks 2 and 3 pump houses (Buildings 205 and 140), the western portion of Drydock 1, the Gatehouse (Building 204), and the Paint and Tool Building (Building 207) as the only structures on HPS considered eligible for listing on the NRHP, consistent with the findings of the 1997 JRP report and the subsequent SHPO concurrence. No other buildings or structures had previously been evaluated for listing on the CRHR.

- In 2008, Circa Historic Property Development performed another investigation of HPS for this EIR. Circa identified a total of 134 buildings and structures at the HPS Phase II site. The investigation evaluated the eligibility of buildings and structures for the NRHP, the CRHR, or local historic registers. Since Circa's initial investigation four of these buildings have been demolished including Buildings 365, 408, 421, and 916. Of the 130 remaining buildings and structures, 11 were identified as part of a CRHR-eligible historic district the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This district includes buildings, structures, and objects associated with the area's "transition from early commercial drydock operation to high tech naval repair and Radiological research."[260] The proposed expanded historic district is potentially eligible for the CRHR, though it encompasses NRHP eligible properties. The Period of Significance has been identified as 1901–1963. Contributing resources in the district include the first six structures listed below which were initially identified as part of the NRHP eligible Hunters Point Commercial Dry Dock Historic District in 1998, and the five additional structures identified by Circa in 2008. Figure III.J-2 (Potential Historic District) shows the location of the potential historic district:

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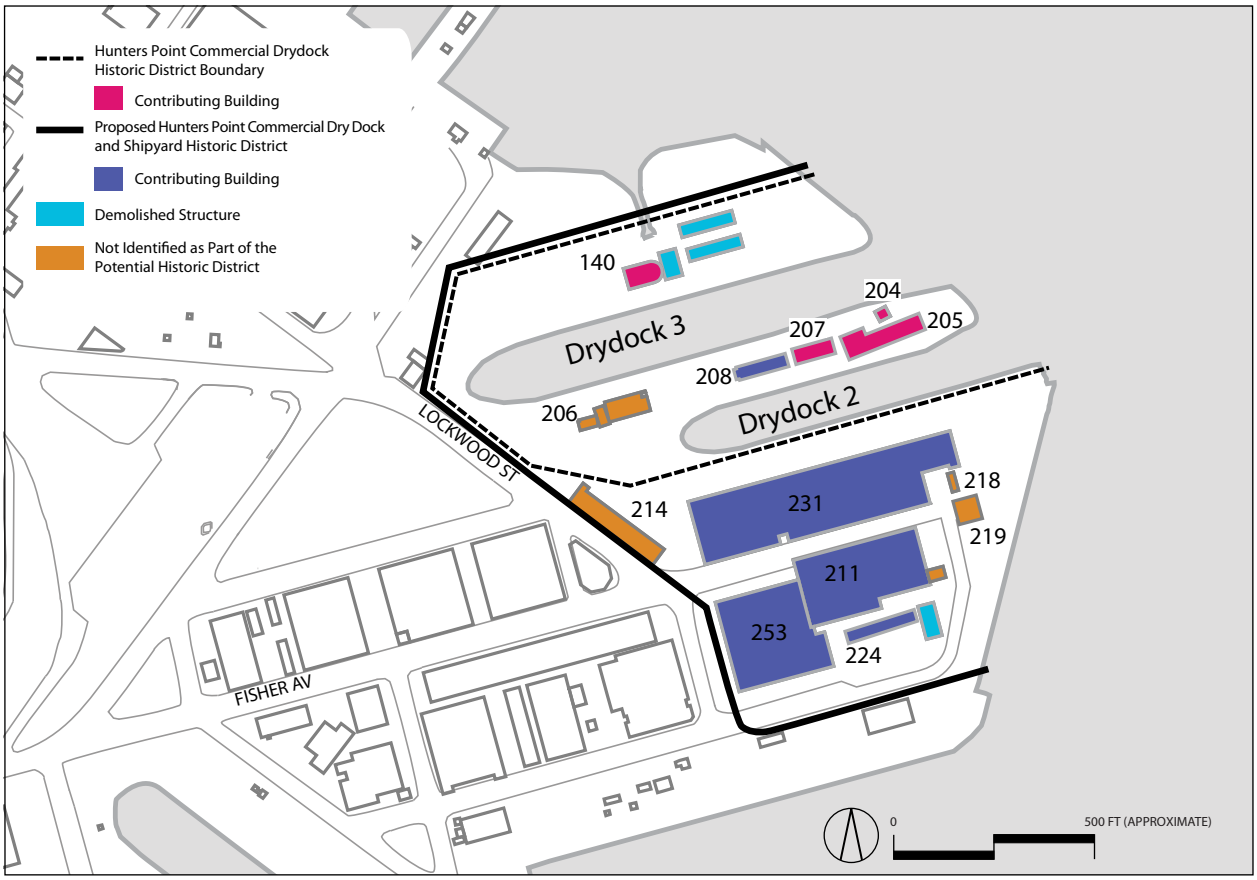
[258] Baumberg, Bonnie L., Urban Programmers, *Historical Overview of Hunters Point Annex, Treasure Island Naval Base and Descriptions of Properties that Appear to Qualify for Listing in the National Register of Historic Places*, 1988.
[259] Louis S. Wall, Department of the Navy to Lee Keatinge, Advisory Council on Historic Preservation, October 15, 1998. Findings of May 29, 1998 letter from SHPO to Navy are stated in this letter.
[260] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.



SOURCE: City and County of San Francisco, 1993b; Circa, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

POTENTIAL HISTORIC DISTRICT

FIGURE III.J-2

1. Drydock 2 (Part of Hunters Point Commercial Dry Docks Historic District determined eligible for the NRHP by SHPO in 1998)
2. Drydock 3 (Part of Hunters Point Commercial Dry Docks Historic District determined eligible for the NRHP by SHPO in 1998)
3. Building 140 (Part of Hunters Point Commercial Dry Docks Historic District determined eligible for the NRHP by SHPO in 1998)
4. Building 204 (Part of Hunters Point Commercial Dry Docks Historic District determined eligible for the NRHP by SHPO in 1998)
5. Building 205 (Part of Hunters Point Commercial Dry Docks Historic District determined eligible for the NRHP by SHPO in 1998)
6. Building 207 (Part of Hunters Point Commercial Dry Docks Historic District determined eligible for the NRHP by SHPO in 1998)
7. Building 208
8. Building 211
9. Building 224
10. Building 231
11. Building 253

Table III.J-1 (Historic Resources Significance Status) provides the NRHP and CRHR status for all of the buildings and structures at Hunters Point.

Table III.J-1 Historic Resources Significance Status

Resource	*Year Built*	*Status*	*NRHP*	*CRHR*
Building 140	1918	2D2	District Contributor	District Contributor
Building 204	1901	2D2	District Contributor	District Contributor
Building 205	1901	2D2	District Contributor	District Contributor
Building 207	c. 1930 (remod. 1942)	2D2	District Contributor	District Contributor
Building 208	c. 1930 (remod. 1942)	3CD	—	District Contributor
Building 211	1942	3CD	—	District Contributor
Building 224	1944	3CD	—	District Contributor
Building 231	1942–45	3CD	—	District Contributor
Building 253	1947	3CD	—	District Contributor
Drydock 2	1903	2D2	District Contributor	District Contributor
Drydock 3	1918	2D2	District Contributor	District Contributor
Drydock 4	1943	2S2	Individually Eligible	Individually Listed

SOURCE: Circa Historic Property Development, Bayview Waterfront Plan Historic Resources Evaluation, October 2009.

As noted earlier, Drydock 4, located in the HPS Phase II site, is additionally eligible for individual listing on the NRHP.

Potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District

According to the California Office of Historic Preservation, historic districts "consist of a significant concentration or continuity of associated historical resources. [They] may be recognized and documented at the time a survey is conducted, or they may become apparent only after several survey efforts reveal the historical relationships among the individually recorded resources in a given geographic region." National Register Bulletin No. 15, How to Apply the National Register Criteria for Evaluation, states that, "A district derives its importance from being a unified entity, even though it is often composed of a wide variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties."

HPS has a long history that began during a period of transition between wood-hulled sailing vessels and steel-hulled motor-driven vessels and ended with modern military craft. It serviced private ships during the height of shipping on San Francisco Bay as well as military ships during four major wars/conflicts (Spanish-American War, World War I, World War II, and the Korean Conflict). Towards the end of this period, it also served as a major radiological research facility that was unique within the United States military. This evaluation includes buildings that individually represent these various areas of significance and collectively demonstrate the broad spectrum of historical development at the Shipyard.

The potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District is comprised of a collection of buildings, structures, and objects associated with the area's transition from early commercial drydock operation through its period of radiological research. The district encompasses a range of buildings from each of the three primary periods of significance for HPS: early drydocks, Navy use in World War II, and radiological research in the World War II and post-war periods. Related site features associated with the district include light standards, rail spurs, crane tracks, drydock perimeter fencing, bollards, and cleats.

The potential historic district encompasses a cross section of buildings, structures and objects, varying in age and function from the early commercial drydock operations (1903), through the Shipyard's function as a high tech naval ship repair and decontamination facility in World War II, and as a ship repair and radiological research facility in the post-war period (1946–1969). The industrial buildings (140, 204, 205, 207, 208, 211, 231, 224, and 253), Drydocks 2 and 3, and other related site features represent a microcosm of the historical development and context of HPS. The potential district contains previously determined National Register eligible buildings (automatically listed as a district on the CRHR) as well as recommended contributors to an expanded, potential CRHR Historic District (including Drydock 2, Drydock 3, and Buildings 140, 204, 205, 207, 208, 211, 224, 231, and 253). The proposed contributors to the expanded CRHR eligible district include the previously eligible NRHP district contributors plus Buildings 208, 211, 224, 231, and 253. Though the condition of the buildings ranges from good to fair, the potential district as a whole retains a high degree of integrity of location, design, setting, workmanship, materials, association, and feeling.

A district can comprise both features that lack individual distinction and individually distinctive features that serve as focal points. While Buildings 208, 211, 224, 231, and 253 may not be individually eligible for listing on the CRHR, when combined with the historic drydocks and associated buildings, the district is a physical representation of the broad history of HPS. Figure III.J-3 (Potential Historic Structures) illustrates views of Buildings 211, 224, 231, and 253.

East Elevation — Building 231

East Elevation — Building 211

Northwest Elevation — Building 253

North Elevation — Building 224

SOURCE: Page and Turnbull Feasibility Study, 2009; (Building 224) CIRCA 2009; PBS&J, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

POTENTIAL HISTORIC STRUCTURES

FIGURE III.J-3

No buildings remain from the earliest drydock operations within the historic district boundaries. Remnants of Drydock 1 (1868) may or may not exist in the area with sufficient potential to yield information that make the property eligible for the NRHP. Until existence of the remnants of Drydock 1 has been demonstrated, its location should be treated as an archaeologically sensitive area and as a potential contributing element of the district. Refer to the "Archaeological Resources" section below for a discussion of maritime archaeological resources.

Paleontological Resources

Fossils have been reported in Franciscan rocks.[261] Radiolarian chert beds in the Franciscan Complex contain microfossils of radiolarian—the silicon-based skeletons of single-celled planktonic marine organisms—which are important as stratigraphic markers. Limestone nodules and concretions in Franciscan shales, and the shales themselves, often contain radiolaria, foraminifera (another single-celled marine organism), gastropods (snails), pelecypods (clams), and plant microfossils (pollen and spores). Exposures of Franciscan rocks in the vicinity of the Project appear non-fossiliferous.[262] The undifferentiated Pleistocene sediments, which may encompass some of the Colma Formation, contain marine and terrestrial fossils including the bones and teeth of mammoth and extinct bison, a leg bone of a ground sloth, and fossil diatoms (single-celled freshwater and marine algae), pollen, and peat.[263] Fossil mollusk shell fragments were recovered from these sediments at a depth of about 30 feet in a geotechnical borehole near Islais Creek, about 1.5 miles along the shore northwest of the Project site. Late Pleistocene and Holocene fossils have been recovered from marine sediments (older Bay mud) near the Bay Bridge San Francisco Anchorage, including remains of petrified wood, marine mollusks and mammals, bony fishes, amphibians, reptiles, birds, a diversity of extinct land mammals such as ground sloths, mammoth, mastodon, deer, horse, camel, and bison, and microfossils such as radiolaria, foraminifera, diatoms, pollen, and spores. Fossil mollusk shells were reported in cores of Holocene younger Bay mud from depths of approximately 20 and 25 feet in the borehole near Islais Creek.[264] No fossils have been reported from artificial fill in the San Francisco Bay area; however, because artificial fill includes sediments from older formations, it is possible that such fossils exist, although fossils transported from their original locations would lack stratigraphic context and be of limited value.[265]

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[261] Schlocker, J., 1974.
[262] CH2MHill, 2004, p. 15.
[263] CH2MHill, 2004, p. 16.
[264] CH2MHill, 2004, pp. 13–18; University of California Museum of Paleontology, http://bscit.berkeley.edu/ucmp/loc.shtml (online search number 496357 through UCMP Locality Search, July 3, 2009 by G. J. Burwasser, PG 7151); American Museum of Natural History, Division of Paleontology, http://paleo.amnh.org/fossil/seek.html (online search through AMNH Advance Search, July 3, 2009 by G. J. Burwasser, PG 7151); North American Mammalian Paleofaunal Database, Rancholabrean age/stage, http://paleodb.org/cgi-bin/bridge.pl?action=displayInterval&interval_no=237 (accessed July 3, 2009 by G. J. Burwasser, PG 7151).
[265] CH2MHill, 2004, pp. 13–18.

III.J.3 Regulatory Framework

Federal

Federal regulations for cultural resources are primarily governed by Section 106 of the *National Historic Preservation Act of 1966* (NHPA), which applies to actions taken by federal agencies, including projects that take place on federally controlled land or facilities, require federal agency permits, or receive federal funding. The criteria for determining NRHP eligibility are found in 36 *Code of Federal Regulations* (CFR) Part 60. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and affords the federal Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. Section 301(7) of the NHPA defines an undertaking as any project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including:

- Those carried out by or on behalf of the agency
- Those carried out with federal financial assistance
- Those requiring a federal permit, license, or approval
- Those subject to state or local regulation administered pursuant to a delegation of approval by a federal agency[266]

The NHPA also authorizes the Secretary of the Interior to maintain a National Register of Historic Places and directs the Secretary to approve state historic preservation programs that provide for a State Historic Preservation Officer.

The Council's implementing regulations, "Protection of Historic Properties," are found in 36 CFR Part 800. The NRHP criteria (contained in 36 CFR 60.4) are used to evaluate resources when complying with NHPA Section 106. Those criteria state that eligible resources comprise districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and any of the following:

a) Are associated with events that have made a significant contribution to the broad patterns of our history
b) Are associated with the lives of persons significant in our past
c) Embody the distinctive characteristics of a type, period, or method of construction, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction
d) Have yielded or may be likely to yield, information important to history or prehistory

Archaeological site evaluation assesses the potential of each site to meet one or more of the criteria for NRHP eligibility based upon visual surface and subsurface evidence (if available) at each site location, information gathered during the literature and records searches, and the researcher's knowledge of and familiarity with the historic or prehistoric context associated with each site.

[266] 16 USC 470w(7).

Memorandum of Agreement

In 1999 the Navy entered into a Memorandum of Agreement with the Advisory Council on Historic Preservation and the SHPO regarding the interim lease and disposal and protection of historic properties (Drydock 4 and the Commercial Drydock Historic District) at HPS.[267] Under the MOA the Navy evaluated all building and structures on the Shipyard in consultation with the SHPO, agreed to prepare Registration Forms for the Hunters Point Commercial Drydock Historic and Drydock 2, completed an Archeological Inventory and Assessment, coordinated the disposal of the remaining Shipyard documents, and agreed on the terms of abandonment for Drydock 4. The MOA also laid out the reporting, resolution of objections, and amendment processes for the term of the MOA.

Programmatic Agreement

In 2006/07 a Programmatic Agreement (PA) was signed by the City, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation. The PA specifically addressed historic properties affected by use of revenue from the Department of Housing and Urban Development Part 58 Programs.

State

Public Resources Code (PRC) Section 5020.5 directs the State Historical Resources Commission to develop criteria and methods for determining the significance of archaeological sites. PRC Section 5024.1 establishes the California Register of Historical Resources and criteria for inclusion of resources on the Register. Under CEQA, public agencies must consider the effects of their actions on both "historical resources" and "unique archaeological resources."

"Historical resource" is a term with a defined statutory meaning (refer to PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) and (b)). The term embraces any resource listed in or determined to be eligible for listing in the CRHR. The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest. In addition, properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be "historical resources" for purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC Section 5024.1 and *California Code of Regulations* (CCR), Title 14, Section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource to be potentially eligible for the CRHR and as a historical resource under CEQA.

In addition to assessing whether historical resources potentially impacted by a proposed project are listed or have been identified in a survey process, lead agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a proposed project's impacts to historical resources (PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a)(3)). In general, an historical resource, under this approach, is defined as any object, building, structure, site, area, place, record, or manuscript that:

[267] *Hunters Point Shipyard Reuse Final Environmental Impact Report, Volume 1*, page 3-159, February 2000.

(a) Is historically or archeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political or cultural annals of California; and

(b) Meets any of the following criteria:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2) Is associated with the lives of persons important in our past;

3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4) Has yielded, or may be likely to yield, information important in prehistory or history.

(CEQA Guidelines Section 15064.5(a)(3))

Under CEQA, the significance of an historical resource is materially impaired when a project "demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance" (CEQA Guidelines Section 15064.5(b)(2)(A) and that justify or account for its inclusion in, or eligibility for inclusion in, the CRHR. Thus, a project may cause a substantial change in an historical resource but still not have a significant adverse effect on the environment as defined by CEQA, so long as the historical resource continues to convey its historical significance.

CEQA Guidelines Section 15064.5(b)(3) states that "generally, a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings shall be considered as mitigated to a level of less than a significant impact on the historical resource."

CEQA requires that the effects of a project on an archaeological resource shall be taken into consideration and that if a project may affect an archaeological resource that it shall first be determined if the archaeological resource is an "historical resource", that is, if the archaeological resource meets the criteria for listing in the California Register of Historical Resources (CRHR). To be eligible for listing to the CRHR under Criterion 1, 2, or 3, an archaeological site must contain artifact assemblages, features, or stratigraphic relationships associated with important events, or important persons, or exemplary of a type, period, or method of construction (CEQA Guidelines Section 15064.5(a)(1) and (3) and (c)(1) and (2)). To be eligible under Criterion 4, an archaeological site need only show the *potential* to yield important information. An archaeological resource that qualifies as a "historical resource" under CEQA, generally, qualifies for listing under Criterion 4 of the CRHR (CEQA Guidelines Section 15064.5(a)(3)(D). An archaeological resource may qualify for listing under Criterion 4 when it can be demonstrated that the resource has the potential to significantly contribute to questions of scientific/historical importance (CA OHP. *Preservation Planning Bulletin* No. 5).

CEQA Guidelines Section 15064.5(e) requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native Americans, if any, as timely identified by the NAHC. Section 15064.5 directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Local

San Francisco General Plan and Planning Department Procedures

General Plan

The Urban Design Element of the City of San Francisco *General Plan* acknowledges the importance of historic structures within the City, and emphasizes the importance of older buildings for the "richness of character, texture, and human scale that is unlikely to be repeated often in new development." These structures help to characterize many neighborhoods and serve as landmarks and focal points. General Plan policies regarding architectural resources are discussed in Objective 2 of the Urban Design Element:

Objective 2 Conservation of resources which provide a sense of nature, continuity with the past, and freedom from overcrowding.

- Policy 2.4 Preserve notable landmarks and areas of historic, architectural, or aesthetic value, and promote the preservation of other buildings and features that provide continuity with past development.
- Policy 2.5 Use care in remodeling of older buildings, in order to enhance rather than weaken the original character of such buildings.
- Policy 2.6 Respect the character of older development nearby in the design of new buildings.

The Bayview Hunters Point Area Plan

The *Bayview Hunters Point Area Plan* of the *San Francisco General Plan* was adopted by the Planning Commission in March 2006 to guide the future development of the Bayview Hunters Point district of San Francisco. One goal of the *Bayview Hunters Point Area Plan* is to conserve the archaeological and cultural heritage of Bayview's indigenous population.

The *Bayview Hunters Point Area Plan* recognizes the significance of this deep cultural heritage, and accordingly views the entire geographical area covered by the Plan as having potential archaeological significance. Under this view, archaeological investigation and plan remediation are encouraged for any substantial proposed physical development with the potential to encounter buried archaeological resources within the boundaries of Bayview.[268]

City and County of San Francisco Planning Department CEQA Review Procedures for Historic Resources

The San Francisco Planning Department considers a listing of historical resources approved by ordinance or resolution of the Board of Supervisors or the Planning Commission to be a local register of historical resources for the purposes of CEQA evaluation.[269] San Francisco Preservation Bulletin No. 16 provides guidance for the CEQA review process with regard to historic resources. As a certified local government and the lead agency in CEQA determinations, the City has instituted guidelines and a system for initiating

[268] Articles 10 and 11 are in the process of being revised to account for changes that have resulted from the approval of the HPC.

[269] *Public Resources Code* Sec. 5020.1(k) states, "'Local register of historical resources' means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution."

CEQA review of historic resources. The San Francisco Planning Department's "CEQA Review Procedures for Historical Resources" incorporates the CEQA Guidelines into the City's existing regulatory framework. To facilitate the review process, the Planning Department has established the categories to determine the baseline significance of historic properties based on their inclusion within cultural resource surveys and/or historic districts. These categories include Category A.1 (Resources listed on or formally determined to be eligible for the CRHR), Category A.2 (Adopted local registers, and properties that have been determined to appear or may become eligible, for the CRHR), Category B (Properties requiring further consultation and review), Category C (Properties determined not to be historical resources or properties for which the City has no information indicating that the property is an Historical Resource).

Paleontological Resources

A variety of federal, state, and local regulations and policies protect paleontological resources. These include, NEPA, CEQA, the federal Antiquities Act of 1906, the National Natural Landmarks Program, and the PRC. Under California law, paleontological resources are included in CEQA[270] and are required to be examined as part of the CEQA process. The City has no policies directly protecting paleontological resources, but uses the CEQA process to address potential adverse effects.

CEQA requires that paleontological resources be addressed during the EIR process. CEQA Guidelines, Appendix G, states, in part, that a project will "normally" have a significant effect on the environment if, among other things, it will disrupt or adversely affect a paleontological site, except as part of a scientific study. If paleontological resources are identified during the initial project scoping studies (such as an Initial Study or in a comment on the Notice of Preparation) as being on the project site, the Lead Agency must take those resources into consideration when evaluating the potential effects of the project. In the context of the PRC (Section 5097.5), fossils of vertebrates and evidence of their environment generally are considered important (i.e., "significant") paleontological resources.

III.J.4 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts related to cultural or paleontological resources, but generally consider that implementation of the proposed Project would have significant impacts on these resources if it were to:

- J.a Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, including those resources listed in Article 10 or Article 11 of the *San Francisco Planning Code*
- J.b Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5
- J.c Disturb any human remains, including those interred outside of formal cemeteries
- J.d Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature as defined in CEQA Guidelines Section 15064.5 (3)

[270] *California Administrative Code*, Title 14, Section 4306 et seq., and *Public Resources Code* Section 5097.5.

Analytic Method

The impact analysis for cultural resources is based primarily on the information contained in the following reports, *Historical Context for the Archaeology of the Bayview Waterfront Project, San Francisco, California*, July 2008; *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*, June 2009; *Historic Context for the Bayview Waterfront Plan*, December 2008, and the *Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Draft Historic Resources Survey and Technical Report*, July 2009. The technical studies incorporate archival research, site reconnaissance, and interviews with public agency staff and other informed contacts.

The paleontological resource impact analysis is based on databases searches of the University of California Museum of Paleontology; the American Museum of Natural History, Division of Paleontology; the North American Mammalian Paleofaunal Database in July 2009; and a review of published studies by the United States Geological Survey and other agencies and organizations to identify previously reported fossil finds in the vicinity of the Project site or in the same geologic units that occur at the Project site.

Additionally, the Project's potential contribution to cumulative cultural resource impacts are evaluated in the context of existing, proposed, and reasonably foreseeable future development expected in the Project vicinity. The cumulative context for each type of resource is unique and described in the cumulative impacts section below.

Construction Impacts

Impact CP-1a: Change in Significance of Historical Architectural Resources

Impact of Candlestick Point

Impact CP-1a **Construction at Candlestick Point would not result in a substantial adverse change in the significance of an historical resource. (Less than Significant)** ***[Criterion J.a]***

The Project would demolish Candlestick Park stadium, and would demolish and redevelop the Alice Griffith public housing site. Neither Candlestick Park stadium, nor the Alice Griffith public housing sites are considered eligible for listing on the NRHP, CRHR, or City landmark registers. As discussed above, while the stadium would meet certain NRHP and CRHR criteria for association with events and persons, the stadium does not retain sufficient integrity to qualify as a historic resource. At the time the stadium was analyzed, it was less than 50 years old; however, if reviewed at the 50-year mark, it still would not meet criteria for listing on the NRHP or CRHR due to lack of physical integrity resulting from the extensive alterations discussed above. The Alice Griffith public housing site was determined ineligible for listing on the NRHP, CRHR, or City landmark registers because it was not strongly associated with a significant historical event, was not directly associated with Alice Griffith's productive life, is not distinctive architecturally, and does not have the potential to yield additional important historical information. No other potential historic resources have been identified in the Candlestick Point area of the Project site. Therefore, the Project's construction effects on historic resources at Candlestick Point would be less than significant. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact CP-1b **Construction at HPS Phase II could result in a substantial adverse change in the significance of an historical resource. (Significant and Unavoidable with Mitigation) *[Criterion J.a]***

Historical resources at HPS Phase II include the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, with buildings, structures, and objects associated with the area's "transition from early commercial drydock operation to high-tech naval repair and Radiological research and waste treatment facility."[271] Contributing resources in the potential Hunters Point Historic District include Drydock 2, Drydock 3, and Buildings 140, 204, 205, 207, 208, 211, 224, 231, and 253.

The Project proposes to retain the buildings and structures in the potential Hunters Point Commercial Dry Dock District, identified in 1998 as eligible for listing in the NRHP. Drydocks 2 and 3 and Buildings 140, 204, 205, and 207 would be rehabilitated using the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. Page & Turnbull, architects and historic resource consultants, reviewed the proposed treatment and rehabilitation of Drydocks 2, 3, and 4. The treatments would include repair of concrete surfaces of the drydocks and addition of guardrails along their perimeter. Page & Turnbull found that the proposed treatments would provide a methodology for resolving severe deterioration issues, and ultimately provide for the longevity of the historic resources; the treatments would be consistent with the *Secretary of the Interior's Standards for Rehabilitation*[272] (refer to Appendix J [Drydock Assessment]). Heritage Park is proposed at Drydocks 2 and 3 and would include interpretive display elements related to the history of HPS. Per CEQA Guidelines Section 15064.5(b)(3), these impacts would be mitigated to a less-than-significant level.

- Development at HPS Phase II would result in the demolition of Buildings 211, 224, 231, and 253, which have been determined eligible for the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district; the impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. None of the buildings proposed for demolition has been determined eligible for individual listing on any register; therefore, the loss of these buildings is evaluated based on the impact to the potential Historic District. The potential Historic District includes two docks and nine buildings; therefore, the Project would demolish nearly 50 percent of the contributing resources and could cause the District to be ineligible for inclusion in the CRHR. Implementation of mitigation measures MM CP-1b.1 and MM CP-1b.2 would reduce those impacts; however, the demolition of historic resources would be a significant impact that cannot be reduced to a less-than-significant level. Therefore, the Project would have a significant and unavoidable impact on the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, because of demolition of Buildings 211, 224, 231, and 253. Chapter VI (Alternatives) analyzes

[271] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.
[272] Page & Turnbull, Memorandum Regarding Secretary's Standards Evaluation of Proposed Treatments for Dry Docks, October 5, 2009. The memorandum and evaluation was undertaken by professionals who meet the Secretary of the Interior's Professional Qualification Standards in Historic Architecture and Architectural History.

Alternative 4 (Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge). Alternative 4 would include rehabilitation and reuse of Buildings 211, 224, 231, and 253 in the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. Building 208 would be mothballed and maintained as an element of the cultural landscape. Chapter VI also contains an analysis of Subalternative 4A (CP-HPS Phase II Development Plan with Historic Preservation), which would additionally include rehabilitation and/or reuse of Buildings 211, 224, 231, and 253, while keeping all other components of the Project the same.

To reduce the impact on historic resources at HPS Phase II, the following mitigation measures shall be implemented:

MM CP-1b.1 *Mitigation to Minimize Impacts on Historic Resources at HPS Phase II. To reduce the adverse effect on historical resources, prior to any structural demolition and removal activities, the Project Applicant shall retain a professional who meets the Secretary of the of the Interior's Professional Qualifications Standards for Architectural History to prepare written and photographic documentation of the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, as identified in the report titled* Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Draft Historic Resources Survey and Technical Report*, July 2009, prepared by Circa Historic Property Development.*

The documentation for the property shall be prepared based on the National Park Services' (NPS) Historic American Building Survey (HABS) / Historic American Engineering Record (HAER) Historical Report Guidelines. This type of documentation is based on a combination of both HABS/HAER standards (Levels II and III) and NPS new policy for NR-NHL photographic documentation as outlined in the National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion (March 2005).

The written historical data for this documentation shall follow HABS / HAER Level I standards. The written data shall be accompanied by a sketch plan of the property. Efforts should also be made to locate original construction drawings or plans of the property during the period of significance. If located, these drawings should be photographed, reproduced, and included in the dataset. If construction drawings or plans cannot be located as-built drawings shall be produced.

Either HABS / HAER standard large format or digital photography shall be used. If digital photography is used, the ink and paper combinations for printing photographs must be in compliance with NR-NHL photo expansion policy and have a permanency rating of approximately 115 years. Digital photographs will be taken as uncompressed. TIF file format. The size of each image will be 1600x1200 pixels at 300 ppi (pixels per inch) or larger, color format, and printed in black and white. The file name for each electronic image shall correspond with the index of photographs and photograph label.

Photograph views for the dataset shall include (a) *contextual views;* (b) *views of each side of each building and interior views, where possible;* (c) *oblique views of buildings; and* (d) *detail views of character-defining features, including features on the interiors of some buildings. All views shall be referenced on a photographic key. This photograph key shall be on a map of the property and shall show the photograph number with an arrow indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the dataset.*

All written and photographic documentation of the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District shall be approved by the potential SFRA, in consultation with the ERO, prior to any demolition and removal activities.

MM CP-1b.2 *Interpretive Displays Depicting History of HPS. Interpretive displays related to the history of HPS shall be installed at Heritage Park at Drydocks 2 and 3. The number and type of displays shall be approved by the SFRA, in consultation with the ERO.*

These measures would reduce the significant adverse impact of HPS Phase II on the Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, but not to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact CP-1 **Construction activities associated with the Project could result in a substantial adverse change in the significance of a historical resource. (Significant and Unavoidable with Mitigation) *[Criterion J.a]***

Refer to discussions of Impact CP-1a and Impact CP-1b and associated discussions, above. As discussed above, potential impacts to Drydocks 2 and 3 and Buildings 140, 204, 205, and 207 would be reduced to a less-than-significant level by retaining the drydocks and by rehabilitating the buildings, in accordance with the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.

- As discussed above, the Project would result in the demolition of Buildings 211, 224, 231, and 253, which are historic resources in the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This demolition would result in a significant impact because the proposed actions would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of mitigation measures MM CP-1b.1 and MM CP-1b.2 would reduce those impacts; however, the demolition of historic resources would not be reduced to a less-than-significant level. Therefore, Project effects on these historical resources would be a significant unavoidable adverse impact. Chapter VI (Alternatives) analyzes Alternative 4 (Reduced CP-HPS Phase II Development, HPS Phase II Stadium, No State Parks Agreement, and Without the Yosemite Slough Bridge). Alternative 4 would include rehabilitation and reuse of Buildings 211, 224, 231, and 253 and retention of Building 208 as a cultural landscape element in the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. Chapter VI also contains an analysis of Subalternative 4A (CP-HPS Phase II Development Plan with Historic Preservation), which would include rehabilitation and reuse of Buildings 211, 224, 231, and 253, while keeping all other components of the Project the same.

Impact CP-2a: Change in Significance of Archaeological Resources

Impact of Candlestick Point

Impact CP-2a **Construction at Candlestick Point would not result in a substantial adverse change in the significance of archaeological resources, including prehistoric Native American, Chinese fishing camp, and maritime-related archaeological remains. (Less than Significant with Mitigation) *[Criterion J.b]***

The Project archaeological research has found that archaeological resources expected to be found on the Project site could have important research value and would, therefore, be legally significant under CEQA. Examples of research themes that have been proposed to which expected archaeological resources could contribute significant data include *(i)* the spatial organization and historical development of Chinese fishing

camps; *(ii)* effects, adaptations, and resistance of the fishing camps to anti-Chinese fishing legislation (1885-1930s); *(iii)* spatial organization of shipyards and development of local traditions of boat building technology, including that of the scow schooner and Chinese junks; *(iv)* the development, changing function, and inter-settlement relationships of prehistoric shell mounds; *(v)* comparative spatial organization of shell mound sites; *(vi)* changes in prehistoric faunal and biotic exploitation practices; *(vii)* prehistoric changes in social stratification; and *(viii)* the relationship between Hunters Point-Bayview and South of Market area prehistoric settlements. The Project could also disturb potential Native American burial sites of symbolic and cultural importance to present-day Native American tribes and representatives. Any potential archeological resources, e.g., CA-SFR-9, fishing camps, that are covered by existing development will remain covered and unavailable unless the site is redeveloped.

Mitigation measure MM CP-2a would reduce potential adverse effects of construction-related activities to archaeological resources at Candlestick Point to less-than-significant through implementation of the Project Archaeological Research Design and Treatment Plan.

MM CP-2a *Mitigation to Minimize Impacts to Archaeological Resources at Candlestick Point. Based on a reasonable presumption that archaeological resources may be present within the Project site, the following measures shall be undertaken to avoid any potentially significant adverse effect from the Project on buried or submerged historical resources.*

Overview: The Project Applicant shall retain the services of a qualified archaeological consultant having expertise in California prehistoric and urban historical archeology. The archaeological consultant shall undertake an archaeological testing program as specified herein. In addition, the archaeological consultant shall be available to conduct an archaeological monitoring and/or data recovery program if required pursuant to this measure. The archaeological consultant's work shall be conducted in accordance with this measure and with the requirements of the Project Archaeological Research Design and Treatment Plan (Archeo-Tec. Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California, 2009) at the direction of the City's Environmental Review Officer (ERO). In instances of inconsistency between the requirement of the Project Archaeological Research Design and Treatment Plan and of this archaeological mitigation measure, the requirement of this archaeological mitigation measure shall prevail. All plans and reports prepared by the consultant as specified herein shall be submitted first and directly to the ERO for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Archaeological monitoring and/or data recovery programs required by this measure could suspend construction of the Project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce potential effects on a significant archaeological resource as defined in CEQA Guidelines Section 15064.5(a)(c) to a less-than-significant level.

Archaeological Testing Program: The archaeological consultant shall prepare and submit to the ERO for review and approval an archaeological testing plan (ATP). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the Project, the testing method to be used, and the locations recommended for testing. The purpose of the archaeological testing program will be to determine to the extent possible the presence or absence of archaeological resources and to identify and to evaluate whether any archaeological resource encountered on the site constitutes an historical resource under CEQA.

At the completion of the archaeological testing program, the archaeological consultant shall submit a written report of the findings for submittal to the ERO. If, based on the archaeological testing program, the archaeological consultant finds that significant archaeological resources may be present, the ERO (in consultation with the archaeological consultant) shall determine if additional measures are warranted. Additional measures that may be undertaken include, but are not necessarily limited to, additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. If the ERO determines that a significant archaeological resource is present and that the resource could be adversely affected by the Project, the Project Applicant shall either:

a. Re-design the Project so as to avoid any adverse effect on the significant archaeological resource; or

b. Implement a data recovery program, unless the ERO determines that the archaeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible.

Archaeological Monitoring Program: If the ERO, in consultation with the archaeological consultant, determines that an Archaeological Monitoring Program (AMP) shall be implemented, the AMP shall include the following provisions, at a minimum:

- *The archaeological consultant, Project Applicant, and ERO shall meet and consult on the scope of the AMP prior to the commencement of any Project-related soils disturbing activities. The ERO, in consultation with the archaeological consultant, shall determine what Project activities shall be archaeologically monitored. In most cases, any soils- disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), and site remediation, shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context.*
- *The archaeological consultant shall train all Project construction personnel who could reasonably be expected to encounter archaeological resources of the expected resource(s), how to identify the evidence of the expected resource(s), and the appropriate protocol in the event of apparent discovery of an archaeological resource.*
- *The archaeological monitor(s) shall be present on the Project site according to a schedule agreed upon by the archaeological consultant and the ERO until the ERO has, in consultation with the archaeological consultant, determined that Project construction activities could have no effects on significant archaeological deposits.*
- *The archaeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis.*
- *If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the deposit shall cease. The archaeological monitor shall be authorized to temporarily halt demolition/excavation/pile driving/construction activities and equipment until the deposit is evaluated. If, in the case of pile driving activity (foundation, shoring, etc.), the archaeological monitor has cause to believe that the pile driving activity may affect an archaeological resource, the pile driving activity shall be terminated until an appropriate evaluation of the resource has been made in consultation with the ERO. The archaeological consultant shall immediately notify the ERO of any encountered archaeological deposit. The archaeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit and present the findings of this assessment to the ERO as expeditiously as possible.*

Whether or not significant archaeological resources are encountered, the archaeological consultant shall submit a written report of the findings of the monitoring program to the ERO.

Archaeological Data Recovery Program: The archaeological data recovery program shall be conducted in accord with an Archaeological Data Recovery Plan (ADRP). The archaeological consultant, Project Applicant, and ERO shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archaeological consultant shall submit a draft ADRP to the ERO. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the Project. Destructive data recovery methods shall not be pursued if nondestructive methods are practical.

The scope of the ADRP shall include the following elements:

- *Field Methods and Procedures. Descriptions of proposed field strategies, procedures, and operations.*
- *Cataloguing and Laboratory Analysis. Description of selected cataloguing system and artifact analysis procedures.*
- *Discard and Deaccession Policy. Description of and rationale for field and post-field discard and deaccession policies.*
- *Interpretive Program. Consideration of an on-site/off-site public interpretive program during the course of the archaeological data recovery program.*
- *Security Measures. Recommended security measures to protect the archaeological resource from vandalism, looting, and other potentially damaging activities.*
- *Final Report. Description of proposed report format and distribution of results.*
- *Curation. Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.*

Human Remains and Associated or Unassociated Funerary Objects: The treatment of human remains and associated or unassociated funerary objects discovered during any soil-disturbing activity shall comply with applicable state and federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC), which shall appoint a Most Likely Descendant (MLD) (PRC Sec. 5097.98). The archaeological consultant, Project Applicant, and MLD shall make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines Sec. 15064.5(d)). The agreement shall take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Final Archaeological Resources Report: The archaeological consultant shall submit a Draft Final Archaeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archaeological resource and describes the archaeological and historical research methods employed in the archaeological testing/monitoring/data recovery program(s). Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report.

Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Major Environmental Analysis division of the Planning Department shall receive three copies of the FARR along with copies

of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than presented above.

This measure would reduce the potential Project impacts to CEQA-significant archaeological resources to a less-than-significant level by ensuring that an archaeological testing program is performed and that any discovered archaeological resources are appropriately handled and documented.

Impact of Hunters Point Shipyard Phase II

Impact CP-2b **Construction at HPS Phase II would not result in a substantial adverse change in the significance of archaeological resources, including prehistoric Native American resources, Chinese fishing camps, and maritime related resources. (Less than Significant with Mitigation)** ***[Criterion J.b]***

As discussed above, records indicate that three, and possibly four, prehistoric archaeological sites are located within the HPS Phase II site, including CA-SFR-11, CA-SFR-12, CA-SFR-13, and CA-SFR-14. All of the sites are reported to be shellmounds or shell midden sites.

Moreover, previous archaeological investigations have shown that prehistoric archaeological sites in the HPS Phase II site tend to be located along the original shoreline. Therefore, it is possible that Project-related construction activities may encounter previously unknown archaeological resources. The Project could also disturb potential Native American burial sites of symbolic and cultural importance to present-day Native American tribes and representatives.

Two possible locations for a Chinese fishing camp are identified in HPS. By 1910 five of the nineteen remaining Chinese fishing camps were located at Hunters Point. At least eleven fishing camps were observed along Hunters Point shoreline in the 1930s.

Hunters Point had numerous maritime-related industries, including drydocks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site.

Any potential archeological resources, e.g., fishing camps, that are covered by existing development will remain covered and unavailable unless the site is redeveloped. Mitigation measure MM CP-2a would reduce the potentially significant effects of construction-related activities to the archaeological resources in the HPS Phase II site (described above) to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. This measure would reduce the impact to a less-than-significant level by ensuring that an archaeological testing program is performed and that any discovered resources are appropriately handled, and documented.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact CP-2 **Construction activities associated with the Project would not result in a substantial adverse change in the significance of archaeological resources, including prehistoric Native American resources, Chinese fishing camps, and maritime related resources. (Less than Significant with Mitigation) *[Criterion J.b]***

As discussed above, the Project site is expected to contain subsurface archaeological resources from the Native American, Chinese fishing village, prehistoric, and maritime development periods, including, but not limited to, CA-SFR-9, CA-SFR-11, CA-SFR-12, CA-SFR-13, and CA-SFR-14. Any potential archeological resources, e.g., fishing camps, that are covered by existing development will remain covered and unavailable unless the site is redeveloped. Construction activities associated with the Project could disturb those archaeological resources, and result in potentially significant impacts. The Project could also disturb potential Native American burial sites of symbolic and cultural importance to present-day Native American tribes and representatives. Refer to Impact CP-2a and Impact CP-2b and associated discussions, above. Mitigation measure MM CP-2a would reduce the Project potentially significant effects on archaeological resources to a less-than-significant level through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*.

Impact CP-3a: Change in Significance of Paleontological Resources

Impact of Candlestick Point

Impact CP-3a **Construction at Candlestick Point would not result in a substantial adverse change in the significance of a paleontological resource. (Less than Significant with Mitigation) *[Criterion J.d]***

As discussed above, sedimentary rocks of the Franciscan Complex have a low sensitivity to impacts from Project construction. Sedimentary rocks of the Franciscan Complex have produced significant fossils important for understanding the age, depositional environments, and tectonic history of the San Francisco area and additional fossil remains discovered in rocks of the Franciscan Complex during Project construction could be scientifically important and significant. Although no fossils have been reported from the Project site, the presence of Franciscan sedimentary rocks (chert, sandstone, shale, and greenstone) on Candlestick Point in the Project site indicates the possibility of fossils being discovered during construction-related excavation.

Using Society for Vertebrate Paleontology (SVP) criteria, undifferentiated Pleistocene sediments, which may encompass some of the Colma Formation, have a high sensitivity to impacts from Project construction. Fossil fragments from these sediments have been recovered near Islais Creek northwest of the Project site. The presence of these sediments southwest of the stadium on Candlestick Point in the Project site indicates the possibility of fossils being discovered during construction-related excavation.

Using SVP criteria, the colluvium (slope debris, minor landslides), and artificial fill located within the Project site is not expected to have sensitivity to impacts from Project construction because it is not likely that artificial fill would contain paleontological resources; however, the Bay mud underlying portions of the fill at depth is expected to have a high sensitivity because it is possible, and even likely, that those

materials would contain paleontological resources. Fossil fragments from the Bay mud have been recovered near Islais Creek northwest of the Project site. The presence of the Bay mud under the fill around Candlestick Point and south of South Basin in the Project site indicates the possibility of fossils being discovered during construction-related excavation.

To reduce a potentially significant impact on paleontological resources to a less-than-significant level, the following mitigation measure shall be implemented:

MM CP-3a *Paleontological Resources Monitoring and Mitigation Program: The Project Applicant shall retain the services of a qualified paleontological consultant having expertise in California paleontology to design and implement a Paleontological Resources Monitoring and Mitigation Program (PRMMP). The PRMMP shall include a description of when and where construction monitoring would be required; emergency discovery procedures; sampling and data recovery procedures; procedures for the preparation, identification, analysis, and curation of fossil specimens and data recovered; preconstruction coordination procedures; and procedures for reporting the results of the monitoring program.*

The PRMMP shall be consistent with the Society for Vertebrate Paleontology (SVP) Standard Guidelines for the mitigation of construction-related adverse impacts to paleontological resources and the requirements of the designated repository for any fossils collected. During construction, earth-moving activities shall be monitored by a qualified paleontological consultant having expertise in California paleontology in the areas where these activities have the potential to disturb previously undisturbed native sediment or sedimentary rocks. Monitoring need not be conducted in areas where the ground has been previously disturbed, in areas of artificial fill, in areas underlain by nonsedimentary rocks (serpentinite, greenstone), or in areas where exposed sediment would be buried, but otherwise undisturbed.

The consultant's work shall be conducted in accordance with this measure and at the direction of the City's Environmental Review Officer (ERO). Plans and reports prepared by the consultant shall be submitted first and directly to the ERO for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Paleontological monitoring and/or data recovery programs required by this measure could suspend construction of the Project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce potential effects on a significant paleontological resource as previously defined to a less-than-significant level.

The SVP considered scientific recovery, preparation, identification, determination of significance, and curation to mitigate potentially significant impacts to paleontological resources adequately in most circumstances. Mitigation measure MM CP-3a would reduce the effects of construction-related activities to paleontological resources in the Candlestick Point area to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a Paleontological Resources Monitoring and Mitigation Program.

Impact of Hunters Point Shipyard Phase II

Impact CP-3b **Construction at HPS Phase II would not result in a substantial adverse change in the significance of a paleontological resource. (Less than Significant with Mitigation) *[Criterion J.d]***

As discussed above, sedimentary rocks of the Franciscan Complex have a low sensitivity to impacts from Project construction. Sedimentary rocks of the Franciscan Complex have produced significant fossils

important for understanding the age, depositional environments, and tectonic history of the San Francisco area and additional fossil remains discovered in rocks of the Franciscan Complex during Project construction could be scientifically important and significant. Although no fossils have been reported from the Project site, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point in the Project site indicates the possibility of fossils being discovered during construction-related excavation.

Using SVP criteria, the colluvium (slope debris, minor landslides), serpentinite, and artificial fill located within the Project site is not expected to have sensitivity to impacts from Project construction because it is not likely that artificial fill would contain paleontological resources; however, the Bay mud underlying portions of the fill at depth is expected to have a high sensitivity because it is possible, and even likely, that those materials would contain paleontological resources. Fossil fragments from the Bay mud have been recovered near Islais Creek northwest of the Project site. The presence of the Bay mud under the fill around Hunters Point in the Project site indicates the possibility of fossils being discovered during construction-related excavation.

Mitigation measure MM CP-3a would reduce the effects of construction-related activities to paleontological resources at HPS Phase II to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a Paleontological Resources Monitoring and Mitigation Program.

To reduce any potential significant impact on paleontological resources to a less-than-significant level, mitigation measure MM CP-3a would be implemented. The SVP considered scientific recovery, preparation, identification, determination of significance, and curation to mitigate impacts to paleontological resources adequately in most circumstances. Consequently, the implementation of this measure would reduce the potentially significant adverse environmental impact of Project-related ground disturbance on paleontological resources to a less-than-significant level.

Impact of Yosemite Slough Bridge Construction Activities

Impact CP-3c **Construction of the Yosemite Slough bridge, shoreline improvements, and the marina improvements activities, including in-water activities, would not result in a substantial adverse change in the significance of a paleontological resource. (Less than Significant with Mitigation) *[Criterion J.d]***

Using SVP criteria, the artificial fill located within the Project site is not expected to have sensitivity to impacts from Project construction because it is not likely that artificial fill would contain paleontological resources; however, the Bay mud underlying portions of the fill at depth is expected to have a high sensitivity because it is possible, and even likely, that those materials would contain paleontological resources. As discussed above, fossil fragments from the Bay mud have been recovered near Islais Creek northwest of the Project site. The presence of the Bay mud under the fill in the vicinity of Yosemite Slough and the marina in the Project site indicates the possibility of fossils being discovered during construction-related excavation associated with the Yosemite Slough bridge, shoreline improvements, and the marina improvements.

Mitigation measure MM CP-3a, as described previously, would reduce the potentially significant effects of construction-related activities to paleontological resources in in-water and off-site areas to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a Paleontological Resources Monitoring and Mitigation Program.

Impact of Yosemite Slough Bridge Pile Driving

Impact CP-3d **Pile driving associated with construction of the Yosemite Slough bridge, shoreline improvements, and the marina improvements would not result in a substantial adverse change in the significance of a paleontological resource. (Less than Significant with Mitigation) *[Criterion J.d]***

Construction of the Yosemite Slough bridge, shoreline improvements, and the marina improvements would involve the installation of about 375 new pilings. Details of the installation program are not yet available, but it is probable that there would be disruption of sediments in the shallow-water portions of the driving sites. Using SVP criteria, the artificial fill located within the Project site is not expected to have sensitivity to impacts from Project construction because it is not likely that artificial fill would contain paleontological resources; however, the Bay mud underlying portions of the fill at depth is expected to have a high sensitivity because it is possible, and even likely, that those materials would contain paleontological resources. As discussed above, fossil fragments from the Bay mud have been recovered near Islais Creek northwest of the Project site. The presence of the Bay mud under the fill in the vicinity of Yosemite Slough and the marina in the Project site indicates the possibility of fossils being discovered during construction-related excavation.

Mitigation measure MM CP-3a, as described previously, would reduce the potentially significant effects of construction-related activities to paleontological resources in in-water and off-site areas to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a Paleontological Resources Monitoring and Mitigation Program.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact CP-3 **Construction activities associated with the Project would not result in a substantial adverse change in the significance of a paleontological resource. (Less than Significant with Mitigation) *[Criterion J.d]***

Refer to Impact CP-3a through Impact CP-3d and associated discussions, above. As discussed above, the presence of sedimentary rocks and Bay mud in the Project site indicates the possibility of fossils being discovered during construction-related excavation, or marina, or Yosemite Slough bridge construction.

Mitigation measure MM CP-3a, as described previously, would reduce the potentially significant effects of construction-related activities to paleontological resources throughout the Project site to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*.

Cumulative Impacts

The cumulative analysis for impacts on cultural and paleontological resources considers a broad regional system of which these resources are a part. The cumulative context for historical resources is the San

Francisco Bay Area Peninsula (Peninsula), which contains both San Francisco and San Mateo counties where common patterns of historic-era settlement have occurred. The cumulative context for archaeological resources and human remains is the northern tip of the San Francisco peninsula where Native American archaeological sites, Chinese fishing camps, and maritime activities were concentrated. The cumulative context for paleontological resources is the Quaternary deposits of the Bayside portions of the San Francisco Bay Area and Franciscan Complex bedrock throughout the Bay Area.

Historical Resources

Urban development that has occurred over the past several decades along the Peninsula, specifically along the Bay with regards to marine/port type resources has resulted in the demolition and alteration of significant historical resources, and it is reasonable to assume that present and future development activities will continue to result in impacts on significant historical resources, including residential, commercial, and civic properties, that are listed or eligible for listing on national, state, or local registers.

Federal, state, and local laws protect historical resources in most instances, but it is not always feasible to protect historical resources, particularly when preservation in place would frustrate implementation of projects. For this reason, the cumulative effects of development along the Peninsula on historical resources are considered significant.

San Francisco and other bay-side communities along the Peninsula contain numerous known resources of historic and cultural value. In addition, undocumented buildings or structures of historic age which qualify as historical resources pursuant to CEQA may also exist within the City. Enforcement of existing local codes and policies, including the Urban Design Element of the San Francisco General Plan, aimed at the preservation and protection of historical resources would ensure that development activities resulting from implementation of the Project would undergo rigorous review to determine impacts on historical resources in accordance with CEQA and would encourage the avoidance of significant impacts through explicitly defined actions and development incentives. Nonetheless, because existing and proposed City policies do not explicitly prohibit demolition or alteration of historic-period buildings or structures, it is possible that development activities resulting from implementation of the Project could cause a substantial adverse change in the significance of a historical resource. Because the Project would adversely affect significant historical resources that are unique and non-renewable members of finite classes, even with the implementation of mitigation measures MM CP-1b.1 and MM CP-1b.2, the Project's incremental contribution to these cumulative effects would itself be potentially cumulatively considerable, and thus significant and unavoidable.

Archaeological Resources

Any potential archeological resources such as fishing camps that are covered by existing development will remain covered and unavailable unless the site is redeveloped. Past urban development that has occurred along the Peninsula has resulted in damage and destruction of archaeological resources. For this reason, the cumulative effects of development along the Peninsula and surrounding the Bay to archaeological resources are considered significant. In recent years, CEQA has required that development projects identify the potential for archaeological resource impacts and mitigate those impacts (CEQA Section 21083.2 and CEQA Guidelines 15064.5). Consequently, development in the recent past has not, and development in the present and the reasonably foreseeable future would not contribute to a significant adverse cumulative

archaeological resource impact. Similarly, with implementation of mitigation measure MM CP-2a, the Project would have a less-than-significant impact on archaeological resources that are unique and non-renewable members of finite classes, and the Project's incremental contribution to these cumulative effects would not be cumulatively considerable, as it would not contribute to a loss of valuable resources.

Paleontological Resources

Urban development that has occurred over the past several decades in Quaternary deposits of the Bayside portions of the San Francisco Bay Area and Franciscan Complex bedrock throughout the Bay Area has damaged paleontologically sensitive rock and sediment formations with the resultant loss of paleontological resources. Federal, state, and local laws protect paleontological resources in many instances, but protection is not always feasible, particularly when preservation in place would frustrate implementation of proposed development. For this reason, the cumulative effects of development in Quaternary deposits and Franciscan bedrock on paleontological resources are considered significant. In recent years, CEQA has required that development projects identify the potential for paleontological resources and mitigate those impacts. Consequently, many development projects in the recent past have not, and many development projects in the present and reasonably foreseeable future would not contribute to a significant adverse cumulative paleontological resource impact. Similarly, with implementation of mitigation measure MM CP-3a, the Project would have a less-than-significant impact on paleontological resources that are non-renewable members of finite classes, and the Project's incremental contribution to these cumulative effects would not be cumulatively considerable, as it would not contribute to a loss of these valuable resources.

Human Remains

As previously discussed, the Peninsula is known to be rich in subsurface archaeological resources in certain settings, and the archaeological record indicates a high level of habitation/seasonal habitation and resource use by Native Americans. Although past projects have contributed to a significant loss of these resources, in recent years CEQA has required that development projects with the potential to affect human remains must implement procedures in order to ensure their appropriate treatment (CEQA Guidelines Section 15064.5). Consequently, development projects in the recent past have not, and development projects in the present and reasonably foreseeable future would not contribute to a significant adverse cumulative human remains impact. Similarly, with implementation of mitigation measure MM CP-2a, the Project would have a less-than- significant impacts on cultural resources that are unique and non-renewable members of finite classes, and the Project's incremental contribution to these significant cumulative impacts would not be cumulatively considerable, as it would not contribute to a loss of significant resources.

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SECTION III.K HAZARDS AND HAZARDOUS MATERIALS

III.K.1 Introduction

This section considers the range and nature of foreseeable hazardous materials and physical hazards impacts resulting from construction and occupancy of the Project. It identifies the primary ways these hazards could expose people and the environment to various health and safety risks associated with those hazards. This section describes the available information about hazardous materials in soil, sediment, surface water, and groundwater at the Project site and evaluates the potential for construction and occupancy of the Project to affect, or be affected by, environmental contamination associated with historic and current land uses within the Project site. It provides basic definitions of terms, and background on physical conditions. Historic and current land uses are summarized in this section, based on reports prepared by the Navy for the HPS Phase II, environmental assessments and documents that describe conditions in Candlestick Point, and a review of regulatory databases. In addition, a description of regulatory requirements that provide for the management of soil or groundwater contamination on the Project site is provided. Due to the unique contamination conditions and remediation efforts at HPS Phase II, portions of the impact analysis are presented separately from the analysis of Candlestick Point.

This section also describes the nature and extent of routine hazardous materials used in existing land uses in the Project site (e.g., production, distribution, and repair [PDR] uses and mixed-use development), and the potential for upset and accident conditions in which hazardous materials could inadvertently be released. The impact analysis identifies how proposed new land uses would introduce additional operational components (e.g., Research & Development [R&D]) that would increase the types and amounts of hazardous materials routinely used, stored, or transported to, from, and within the Project site, and the extent to which existing and future populations could be exposed to hazardous materials.

Other elements of hazardous materials exposure and potential risks to human health and the environment are air emissions. Sources of hazardous or toxic air emissions include, but are not limited to: processes (e.g., laboratory fume hood exhaust in R&D uses); vehicle use (diesel particulate emissions from exhaust); and proximity to existing or relocated sources of diesel or other toxic air emissions such as freeways and railroads and off-site industries and businesses. Impacts related to toxic air contaminants, including the release of diesel particulate matter from construction truck trips and/or delivery truck trips (when the haul routes are located within one-quarter mile of an existing or proposed school) are identified in Section III.H (Air Quality). The Project's proximity to air traffic and the potential for air safety hazards is evaluated in this section, along with an analysis of potential fire hazards and emergency response/access issues associated with the proposed intensification of land uses. Other safety hazards, such as earthquakes, are addressed in Section III.L (Geology and Soils). Flooding and sea level rise are addressed in Section III.M (Hydrology and Water Quality).

The use of hazardous materials in existing development, as well as any proposed future activities involving hazardous materials, along with the generation of hazardous wastes in the land uses, is governed by numerous federal, state, and local laws and regulations, which are summarized in this section. This section identifies both Project level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts.

Scope of Analysis

Hazardous Materials Contamination Associated with Historic and Current Uses

There are substantial ongoing remediation programs at known hazardous material release sites at portions of the Project site from former Navy operations, Triple A Machine Shop, Inc., and/or its lessees throughout HPS Phase II. These are the only known hazardous material release sites requiring remediation at the Project site; there are no known hazardous material release sites requiring remediation at Candlestick Point, or at locations where off-site improvements are proposed, based on the results of investigations to date and a review of government agency databases. For Candlestick Point and off-site locations, however, the analysis recognizes the potential for previously unknown contamination to be encountered, and recommends mitigation measures to address that potential.

The remediation program at HPS Phase II is being carried out under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) and through a 1992 Federal Facilities Agreement (FFA) between the Navy and federal and state regulatory agencies. This ongoing remedial program is required to implement all remedial actions necessary to protect human health and the environment from risks associated with hazardous materials released into soil or groundwater, in consideration of the uses contemplated by the Project. As was the case in the Final Environmental Impact Report for HPS dated February 8, 2000,[273] and the Addendum to that FEIR dated November 19, 2003,[274] which supported the approval of the Phase 1 development at HPS, these ongoing remediation activities are not part of the Project. Thus, the goal of this EIR is not to assess the adequacy or impacts of the Navy's remediation actions. The relevant environmental regulatory agencies would require performance of these remedial activities regardless of whether this Project or any other development proposals were proceeding. Potential environmental effects of the remedial activities, i.e., of soil excavation, soil transport, and operation of treatment systems, have been, and will continue to be, evaluated by the Navy and regulatory agencies in conjunction with the approval process for specific remedial actions, and appropriate environmental controls have been, and will continue to be, incorporated into the design and implementation of those remedial actions. Therefore, although this EIR evaluates the potential for construction and occupancy of the Project to affect, or be affected by, hazardous materials release sites, it does not evaluate the potential impacts of the specific remedial activities conducted as part of these ongoing programs. However, this EIR does evaluate the potential impacts of certain limited remedial activities proposed to be conducted in conjunction with development activities, as described below.

[273] San Francisco Redevelopment Agency and Planning Department, *Final Environmental Impact Report, Hunters Point Shipyard Reuse*, February 8, 2000. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[274] San Francisco Redevelopment Agency and Planning Department, *Hunters Point Shipyard Phase I Addendum to Final Environmental Impact Report, Hunters Point Shipyard Reuse*, November 19, 2003. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Proposed Land Uses—Operational Impacts

The Project Description identifies proposed land uses, but the specific businesses or activities that could operate in the Project are not known at this time. The analysis assumes nearly all Project uses would involve the routine use of hazardous materials at varying levels, including uses at existing PDR and mixed-use land uses, and that there is the potential that such use could result in a release of hazardous materials. In each case, the potential hazards and the risks they would pose to people or the environment would depend on what materials would be used, where the materials would be used and stored, how they would be used, and who would use them. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this stage of Project development. Therefore, the analysis qualitatively evaluates broad categories of hazardous materials use, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios and households. For purposes of the analysis, compliance with existing federal, state, and local laws and regulations pertaining to hazardous materials management would be sufficient to minimize health and safety risks, because these laws and regulations have been designed to protect health and safety and are enforced by state and local agencies.

The analysis of air traffic hazards is not addressed in detail in this EIR because the Project is not within hazard zones for any airport.

Regulatory Requirements and Mitigation Measures

HPS Phase II

All necessary remedial actions at HPS Phase II required by CERCLA, the FFA, or other applicable law must be completed to the satisfaction of the relevant regulatory agencies, and those agencies must determine that the site is suitable for its intended use, whether those remedial activities take place before or after the Navy transfers ownership of the property. The mitigation measures set forth in this section require the Project to be consistent with any requirements imposed as part of these remediation programs, and the federal, state, and local laws governing those remediation programs. For example, if such laws require institutional controls such as land use covenants that prohibit certain activities or types of land use on portions of the Project site or require the preparation and implementation of a Risk Management Plan (RMP), the mitigation measures set forth below impose the same requirements. Similarly, the mitigation measures require the Project to be implemented consistent with the terms of any property transfer document, e.g., if the Navy transfers ownership or leases portions of HPS Phase II prior to completion of remedial activities, the mitigation measures require the transferee to comply with all applicable activity and use restrictions set forth in the lease or deed.

Candlestick Point

Before permits are issued from the San Francisco Department of Building Inspection for development activities at the portions of Candlestick Point that are bayward of the 1851 high tide line (and, therefore, constructed on "Bay Fill" material), the Project Applicant must prepare a site history and soil sampling work plan, conduct soil sampling and analysis and, if found to be necessary, propose and implement site

mitigation measures[275] under the supervision of the San Francisco Department of Public Health as required by Article 22A of the *San Francisco Health Code* (sometimes called the Maher Ordinance). Mitigation measures identified in this EIR that are consistent with Article 22A (site mitigation measure requirements) are included below. No potentially significant impacts from exposure to hazardous materials release sites have been identified at the portions of Candlestick Point landward of the 1851 high tide line (i.e., in bedrock areas and/or areas containing soil deposited by natural means), based on publicly available information. However, because there is a potential that previously unidentified (or unknown) contaminated sites could be encountered during development activities (either within the Project site or at off-site improvement locations), this EIR identifies mitigation measures consistent with applicable federal and state regulatory requirements to prevent those activities from adversely affecting human health and the environment.

Certain other types of hazardous materials that may be present at the site (e.g., asbestos and lead-based paint in building materials, or naturally occurring asbestos in bedrock) are not addressed by the remediation programs described above but instead are addressed by mitigation measures requiring actions consistent with applicable regulatory requirements are provided.

Hazardous Materials Use

As a result of the health and safety risks associated with the use of hazardous materials, hazardous materials use, storage, and disposal are subject to numerous laws and regulations at various levels of government. These laws and regulations are identified in this Section. In most cases, the laws and regulations pertaining to hazardous materials management are sufficient to minimize risks to human health and the environment, except where site-specific conditions warrant additional consideration. The impact analysis identifies areas where impacts related to hazardous materials during Project occupancy may, nonetheless, be potentially significant. In these cases, feasible mitigation measures are identified.

Hazardous Materials Basic Concepts and Terms

Some of the key terms used in the management of hazardous materials and the context within which they apply to sites where contaminants have been identified in soil or groundwater are presented below. Additional terminology is provided in the EIR glossary in Chapter VIII (Acronyms/Abbreviations and Glossary).

- A "hazardous material" is any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (*California Health and Safety Code*, Section 25501).
- A "hazardous materials release site" refers to any area, location, or facility where a hazardous material has been released or threatens to be released to the environment.

[275] The "site mitigation measures" required under Article 22A, Section 1228 are identified separately and independently of the CEQA process.

- "Remedial action" or "remediation" refers to actions required by federal, state, or local laws, ordinances, or regulations necessary to prevent, minimize, or mitigate damage that may result from the release or threatened release of a hazardous material. These actions include site cleanup, monitoring, testing, and analysis of site conditions, site operation and maintenance, and placing conditions or restrictions on the land use of the site upon completion of remedial actions. This section describes those actions and it is assumed that those actions would appropriately prevent, minimize, or mitigate potential environmental impacts.

The risk to human health and the environment is determined by the probability of exposure to hazardous material(s) and the severity of harm such exposure would pose. That is to say, the likelihood and means of exposure, in addition to the inherent toxicity of a material, are used to determine the degree of risk to human health or the ecological environment. For example, a high probability of exposure to a low toxicity chemical would not necessarily pose an unacceptable human health or ecological risk, whereas a low probability of exposure to a very high toxicity chemical might. Methodologies have been established by the US Environmental Protection Agency (USEPA), which are also used at the state level, to quantify that risk. The quantified risk levels are one of several elements used in the decision-making process to determine how that risk should be managed.

III.K.2 Setting

This Setting describes the nature and extent of hazardous materials release sites within the Candlestick Point and HPS Phase II sites, along with the current status of investigation and cleanup efforts in those sites. It also identifies Project-wide hazards and hazardous materials conditions such as naturally occurring asbestos, hazardous materials use, and conditions at off-site improvement locations.

Current Conditions at Candlestick Point

As described below, there are no known hazardous materials release sites requiring remediation at Candlestick Point.

Historic Uses at Candlestick Point

Nearly all the land that presently encompasses Candlestick Point was originally submerged beneath the waters of the Bay. The only non-submerged land was Candlestick Point, which rose steeply from the South Basin and was part of the northeastern slope of Bayview Hill.

Historic uses in Candlestick Point were open space with some limited industrial activities. The stadium was constructed in the late 1950s. Candlestick Point State Recreation Area (CPSRA) was established in 1974 to construct a 154-acre park along the eastern shoreline.[276]

Areas of the San Francisco Bay shoreline that border Candlestick Point (as well as HPS Phase II) historically consisted of marshland with tidal sloughs. Beginning in the 1850s, the shallow margins of the Bay were filled to extend the shoreline, and the fill activities have altered the natural shoreline. The majority

[276] Department of Parks and Recreation, *Candlestick Point State Recreation Area General Plan* (State Park and Recreation Commission Approval, November 1978, amended May 1987), March 1988.

of the shoreline was filled between 1906 and 1940, with the Yosemite Slough area and portions between Islais Creek and HPS Phase II filled in the 1930s to 1950s.

As with many other locations along the Bay shoreline in the City, the fill materials were primarily obtained from dune sands, quarried rock from local hillsides, industrial refuse, and building debris following the 1906 earthquake. Hazardous materials used both as standard materials of construction and in the industries that were destroyed during the 1906 fire and earthquake were commonly incorporated into the earthquake debris, which was then used as general fill and subsequently built upon during reconstruction. Because of this historical practice, the 1906 earthquake fill commonly contains hydrocarbons, heavy metals, oil and grease, and semi-volatile organic compounds. Asbestos in fireproofing materials and lead from paints may also be present. The type of fill so far identified within Candlestick Point consists primarily of clays, with some sand and gravel, except in an area south of Yosemite Slough where there is less clay and more sand, gravel and silts. The investigation discussed below indicates that debris found in the fill at Candlestick Point includes crushed concrete, red brick, foam, plastic, ceramic tiles, copper wire, porcelain, glass, and wood fragments.[277]

Alice Griffith Public Housing

The area now occupied by the Alice Griffith public housing site was first developed in 1863 as a horseracing track known as Bay View Park. By the 1880s, the site had been reclaimed by the Bay, and remained undeveloped marshland until World War II. Prior to the construction of the Alice Griffith public housing, the site was occupied by the Double Rock War Dwellings, constructed in the 1940s to house workers at the Shipyard. The site was filled and graded in the early 1960s to construct the Alice Griffith public housing. The source of the fill is unknown, but may have come from the adjacent hillside. The current Alice Griffith public housing site consists of a community of 256 units ranging in size from one to five bedrooms, paved parking, and landscaped areas that were constructed beginning in 1962.

Results of Environmental Investigations at Candlestick Point

In 1998, Geomatrix Consultants, Inc, (Geomatrix) conducted an investigation of the current site of Candlestick Park and associated parking areas, CPSRA and maintenance area, an area north of Yosemite Slough, an area southeast of Harney Way, and Hunters Point Expressway, comprising a total land area of approximately 196 acres, for the then-proposed new stadium and retail mall.[278] The investigation report noted both the presence of fill materials described above and that there were a number of documented underground storage tanks (USTs) throughout Candlestick Point, some of which have been removed along with associated soil remediation, but, as the report concluded, there may still be unknown USTs within Candlestick Point.

To determine if potential releases of hazardous materials associated with fill materials, USTs, or other unidentified sources may present an unacceptable risk to human health or the environment, Geomatrix performed an extensive soil and groundwater sampling program to collect chemical data from areas where

[277] Geomatrix, *Reference Report Summarizing Environmental Conditions Bayview Hunters Point Brownfields Pilot Project, San Francisco, California*, April 1998. Areas SE14, SE11, NE08. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[278] Ibid.

underground and above-ground storage tanks were known to previously exist, and to evaluate chemical types and concentrations in fill at depths of up to 15 feet, the depth at which excavation could occur during the previously planned redevelopment activities. Seventy-eight soil borings were advanced and 26 temporary shallow groundwater monitoring wells installed to investigate the fill areas. Two hundred and twenty soil samples were analyzed for metals, 50 soil samples were analyzed for volatile organic compounds (VOC),[279] 90 soil samples were analyzed for polycyclic aromatic hydrocarbons known as petroleum hydrocarbon constituents (PAHs), and 124 samples were analyzed for pesticides, herbicides, polychlorinated biphenyls (PCBs), and asbestos. Groundwater samples were analyzed for VOCs, total extractable petroleum hydrocarbons as diesel (TEPHd), PAHs, PCBs, pesticides, metals, and total dissolved solids.

The main chemicals detected in soils were PAH and metals (chromium, copper, lead, mercury, nickel, and zinc). PCBs and trace concentrations of chlorinated pesticides were also detected in soil. The organic compounds and metals in soil were found at various and widely disparate depths and locations. This indicated the chemicals were very likely associated with fill materials. Shallow groundwater beneath the site was found to contain low levels of a few organic compounds. A human health risk evaluation concluded that the presence of the detected chemicals in soil and shallow groundwater did not pose a significant carcinogenic or non-carcinogenic risk to future workers or visitors, nearby residents or workers, or recreational users of areas adjacent to the Bay. Compounds of potential ecologic concern (metals and pesticides) were determined to not pose a significant risk to aquatic organisms.[280]

In June 2006, MACTEC conducted a Phase I Environmental Site Assessment (ESA) for Candlestick Point; in March 2009, MACTEC updated the assessment to include the proposed Candlestick Point Center, Alice Griffith housing development, the Jamestown Avenue parcels, and the CPSRA. No releases or areas of recognized environmental conditions were observed or noted during these Phase I assessments. The 2009 Phase I ESA did note that these areas, including the Alice Griffith public housing site, were built on fill materials, so the general statements about fill materials in this section also apply to those portions of Candlestick Point.

In preparing the ESA, MACTEC conducted a site visit of the Alice Griffith site. General maintenance chemicals including paints and cleaners were observed in storage areas. No other petroleum products or hazardous materials were observed, nor was there any indication of past releases of hazardous materials. The ESA did note the potential presence of lead-based paint and the potential for asbestos-containing materials, given the age of the buildings within the Alice Griffith site.

From February 2009 through July 2009, the California Department of Parks and Recreation (DPR) conducted a trail restoration, waste, and rubble removal project at CPSRA. The project was funded by the California Integrated Waste Management Board (CIWMB) through a grant from its Solid Waste Cleanup Program. CIWMB determined that CPSRA was eligible for the program because of the damage caused by a series of fires in the early 1980s in an area of Bay Fill called the Last Rubble Disposal Area.

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[279] A volatile organic compound (VOC) is an organic chemical that readily evaporates at temperatures normally found at the ground surface and at shallow depths.

[280] Geomatrix Consultants, *Site Investigation and Risk Evaluation Report for the Proposed San Francisco 49ers Stadium and Mall Site*, January 12, 1998; and Geomatrix Consultants, *Addendum 1 to the Site Investigation and Risk Evaluation Report for the Proposed San Francisco 49ers Stadium and Mall Site*, January 12, 1998. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

In the context of approving a recent request to conduct geotechnical test drilling in the CPSRA, DPR staff indicated in September 2009 that, decades ago, individuals may have disposed of household hazardous waste on portions of the CPSRA. DPR does not have any files indicating that a state-regulated landfill was on-site. CIWMB staff responded to DPR staff's inquiry about the proposed test drilling by confirming that the activity was "not of regulatory significance."[281]

The scope of work at CPSRA centered around three tasks: the identification and removal of solid waste, rubble, and hazardous materials; the restoration of a few trails and access roads and the re-vegetation of some areas. Areas of CPSRA that were observed to contain hazardous materials or any soil observed to contain burn ash was sampled and tested for organic constituents. Any materials that were deemed to be hazardous were removed and disposed of in compliance with applicable law. During the rubble removal, the contractor and DPR segregated rocks that were suitable for shoreline hardening repairs and preserved all of the granite stones.

According to the California Department of Toxic Substances Control (DTSC) EnviroStor and State Water Resources Control Board (SWRCB) Geotracker online databases, there are currently no known, unremediated, or active hazardous materials release sites at Candlestick Point.[282,283]

Current Conditions at Hunters Point Shipyard

As described below, the historic uses at HPS by both the Navy and its tenants resulted in a number of hazardous materials release sites that are presently undergoing remediation by the Navy under federal law under the supervision of federal and state environmental agencies and in accordance with CERCLA. The Navy and regulatory agencies have determined that none of the areas that are accessible to tenants and visitors is a hazard to current tenants and visitors, as determined in the 2008 Finding of Suitability to Lease (FOSL) issued by the Navy.

Historic Uses at Hunters Point Shipyard

HPS is on a peninsula that extends east into the Bay. The entire HPS covers 936 acres: 496 on land and 440 under water. Maritime activities at HPS began in the nineteenth century when the first drydock was built in 1868. In 1903, a second dry-dock was built and operated by Bethlehem Steel Company. The Navy purchased HPS in 1939 and took over full operations in 1941. Significant construction began in 1941 after American entry into World War II, when the Navy began excavation of the hills surrounding the shipyard, using the resulting spoils to expand the shoreline into the Bay. Expanding the size of the shipyard through filling the Bay with soil, waste, and debris continued through the 1970s. HPS's primary mission was the repair and maintenance of ships and submarines.

After the 1946 atomic tests at Bikini Atoll in the South Pacific, contaminated target and support ships were brought to HPS for decontamination and study. In response to the new need to understand radiological issues, the Naval Radiological Defense Laboratory (NRDL) was established in 1948 at Hunters Point and

[281] Personal communication between Stephen Bachman, California Department of Parks and Recreation, and Jeff Austin, Lennar Bay Area Urban, September 28, 2009.
[282] California Department of Toxic Substances Control EnviroStor website. http://www.envirostor.dtsc.ca.gov/public/> (accessed June 26, 2009).
[283] State Water Resources Control Board Geotracker website. http://geotracker.swrcb.ca.gov (accessed June 26, 2009).

operated until 1969. Historic radiological operations also included the following: repair, use, and disposal of radioluminescent commodity items (dials, gauges, and deck markers); gamma radiography for testing of metal and welds; and laboratory calibration operations for ensuring radiation survey instrument accuracy. Additionally, Mare Island Naval Shipyard used berthing and dry-dock facilities at HPS between 1985 and 1989 for work on nuclear-powered ships. The primary radionuclides involved with these operations were tritium (hydrogen-3 [H-3]), cesium-137, radium-226, strontium-90, thorium-232, plutonium-239, americium-241, and uranium-235.

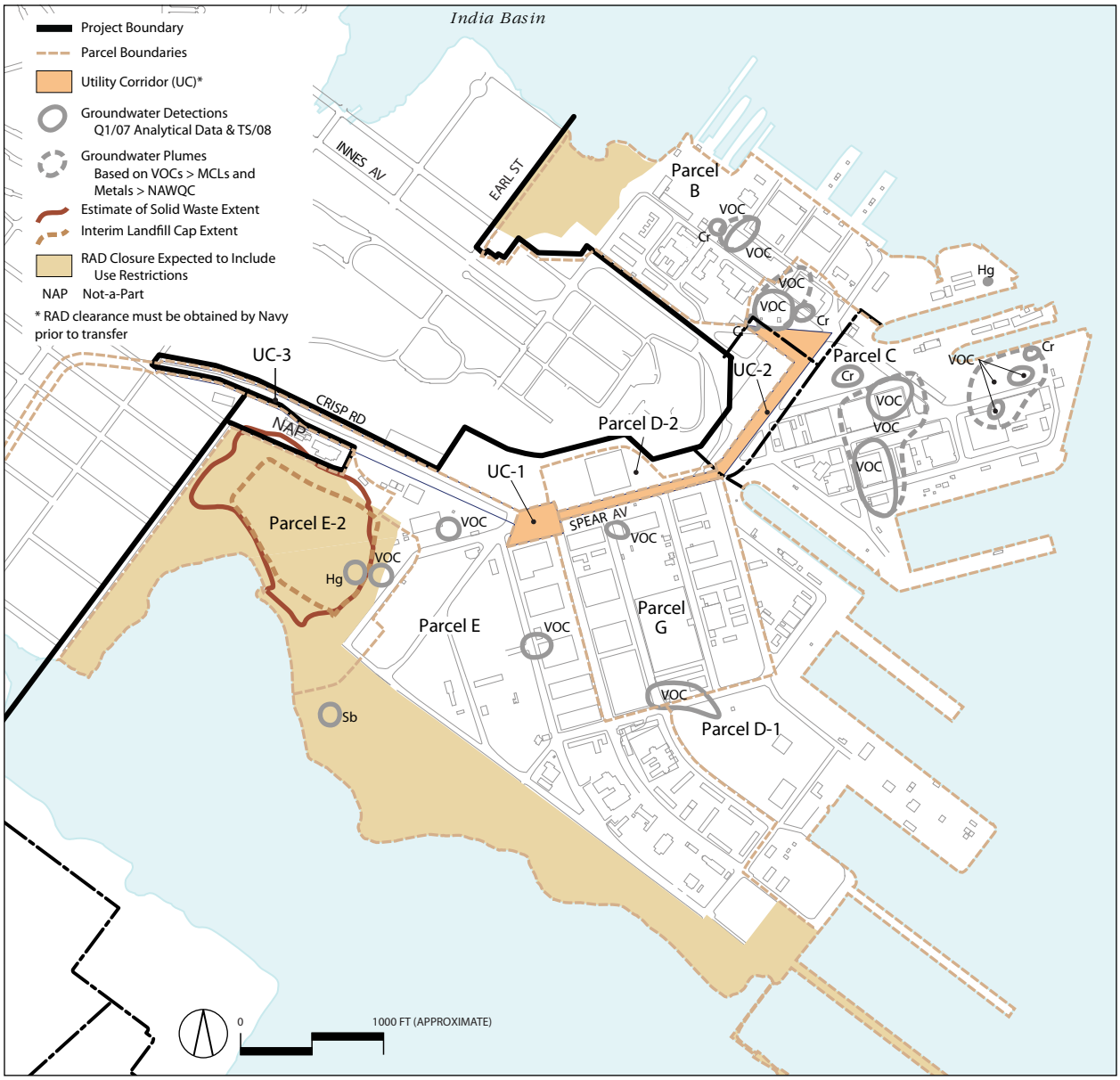
HPS was decommissioned in 1974. In 1976, the Navy leased the site to Triple A Machine Shop (Triple A), which was subsequently indicted and convicted for illegal disposal of hazardous substances at Hunters Point. In 1986, Triple A's 10-year lease expired and was not renewed. The Navy is responsible for addressing hazardous material releases resulting from Triple A's activities. Between 1986 and 1990, the Navy used Hunters Point to repair several naval vessels. In 1991, HPS was placed on the Navy's Base Realignment and Closure (BRAC) list, and its mission as a Navy shipyard ended on April 1, 1994.

Status of Environmental Investigations and Cleanup Activities

The historic operations at HPS Phase II described above are the sources of chemical and radiological contamination that resulted in the need for extensive investigation and development of remedial measures. Beginning in 1984, the Navy has undertaken a comprehensive program to address hazardous materials release sites at HPS. This program is called the "Installation Restoration Program." The property was added to the National Priorities List (NPL) in 1989 as a Superfund site pursuant to CERCLA. HPS is included on the list of hazardous materials sites compiled pursuant to California *Government Code* Section 65962.5 (the "Cortese" list).

In 1992, the Navy, the USEPA Region 9, the DTSC, and the San Francisco Bay Regional Water Quality Control Board (RWQCB) (collectively referred to as the FFA Signatories) entered into a FFA. The FFA establishes a procedural framework and schedule for the remediation of HPS. Environmental investigation and restoration activities at HPS are coordinated as prescribed in the FFA among the Navy, USEPA, and the State of California (including DTSC and RWQCB). The FFA divided the HPS facility into five contiguous geographic parcels (Parcels A, B, C, D, and E) to organize and expedite the cleanup process. A sixth parcel, the offshore area (Parcel F), was added in 1996, and another separate parcel (Parcel E-2) was created in 2004. In 2008, the Navy divided Parcel D into four parcels: D-1, D-2, UC-1, and G. Parcel UC-2 was carved out of Parcel C. Parcels UC-1 and UC-2 will serve as streets and utility corridors.[284] Figure III.K-1 (Hunters Point Shipyard Phase II Hazardous Materials Conditions) shows the locations of the Navy parcels in HPS Phase II. Table III.K-1 (Hunters Point Shipyard Navy Parcels' Relationship to Proposed Districts) shows how the HPS facility cleanup parcel designations generally correspond to the proposed district nomenclature. However, for purposes of this section, the Navy's facility parcel designations are used to describe locations.

[284] As shown in recent Navy fact sheets and report figures, it is anticipated that the Navy will carve an additional street and utility corridor, Parcel UC-3, out of Parcel E in the future.



SOURCE: Treadwell & Rollo, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.K-1

HUNTERS POINT SHIPYARD PHASE II
HAZARDOUS MATERIALS CONDITIONS

Table III.K-1 (Hunters Point Shipyard Navy Parcels' Relationship to Proposed Districts) shows how the HPS facility cleanup parcel designations generally correspond to the proposed district nomenclature. However, for purposes of this section, the Navy's facility parcel designations are used to describe locations.

Table III.K-1 Hunters Point Shipyard Navy Parcels' Relationship to Proposed Districts

Hunters Point Shipyard Parcel Designation	*Proposed HPS Phase II Districts*
A and B	HPS Village Center
C and UC-2	HPS Village Center and R&D
A and D (includes D-1, D-2, and UC-1)	Stadium and R&D/Parking
E	Sports Fields/Parking
E-2	Open Space
F (off-shore)	Marina
G (a portion of Parcel D)	49ers Stadium (or No Stadium option)

SOURCE: Lennar Urban, 2009; Navy documents

The status of the Navy's environmental investigations and cleanup activities at each of the parcels at HPS Phase II is discussed in separate subsections below. To understand the status at each parcel, it is helpful to first have a general understanding of the process followed by the Navy pursuant to the FFA for investigating and cleaning up HPS Phase II.

Overview of the Environmental Investigation and Cleanup Process

The cleanup process under the FFA involves the preparation of an iterative series of reports documenting various investigation and remedial activities, and securing the approval of those reports from the other FFA Signatories (USEPA, DTSC, and RWQCB). Early in its implementation of the Installation Restoration Program, the Navy conducted a Preliminary Assessment and Site Identification (PA/SI) process to identify the locations at HPS requiring additional investigation and perhaps remediation. These locations were identified as "Installation Restoration Sites" (IR sites) and were designated by numbers, IR 1 through IR 78.

After the site identification process, the next step under the Navy's program is the preparation of Remedial Investigation (RI) reports for the IR sites and other locations of concern in each parcel. An RI report addresses the nature and extent of contamination at each IR site in the parcel. A Human Health Risk Assessment (HHRA) is prepared in conjunction with the RI. The HHRA identifies the contaminants that could pose a health risk under different exposure scenarios, and identifies potential numeric remediation goals. At certain sites, an Ecological Risk Assessment (ERA) is also conducted.

The next step is the preparation of a Feasibility Study (FS) for all of the IR sites requiring further action and other locations of concern in a parcel. The FS evaluates the effectiveness and cost of various remedial technologies that can be used to reduce site risk to acceptable levels. Those two steps are often combined through the preparation of a single RI/FS document. The Navy has completed the RI/FS process at all

parcels except Parcels E and E-2.[285] A draft FS has been completed for Parcel E, and a draft final RI/FS has been completed for Parcel E-2. A The Navy often does not wait for the RI/FS process to be complete before commencing physical cleanup activities. The Navy has completed numerous "time critical" (and "non-time critical") "removal actions" and "treatability pilot studies" in conjunction with its physical investigations and evaluation of alternatives for remediating the identified IR sites.

After the RI/FS process is completed, the Navy prepares a Proposed Plan (PP), which summarizes findings of the RI and proposes a preferred remedial approach for each identified IR site in a parcel based on the options evaluated in the FS. After the PP is presented to regulatory agencies and the public, the final decision selecting the remedy for the parcel is documented in a CERCLA Record of Decision (ROD), which is approved by the FFA Signatories. The CERCLA ROD takes into account public comments and community concerns and includes the Navy's response to these comments. RODs have been completed for Parcels B, D-1, UC-1, UC-2, and G. The RODs for Parcels C and D-2 are scheduled to be complete in the 2009-2010 timeframe. The ROD for Parcel F is not expected until 2012.

After the ROD is finalized, a Remedial Design document is prepared to set forth details of how the remedies identified in the ROD will be carried out. Then, the remedial actions are conducted in accordance with the specifications of the approved remedial design, e.g., groundwater treatment systems and soil vapor extraction systems are installed and operated, soil is excavated, caps are installed, land use restrictions are legally recorded, etc. In many cases, these components of the remedy have already commenced or even been completed before issuance of the ROD—as removal actions or treatability studies.

The process described above is for activities addressing hazardous substances under CERCLA. Because CERCLA excludes petroleum from its definition of "hazardous substances," the cleanup of petroleum releases from USTs or other sources is regulated under state law by the RWQCB. The petroleum cleanup follows a parcel-by-parcel iterative process similar to the CERCLA cleanup program; i.e., investigation followed by identification of cleanup options, culminating in the approval by the RWQCB of a "corrective action plan" (CAP) for each parcel (if necessary) and implementation of the cleanup actions identified in that plan.

In addition to the parcel-by-parcel reports described above, the Navy has conducted several basewide investigation and remediation programs for specific types of hazardous materials. Radiological investigations have been prepared on a basewide level for all parcels where there was a potential for radioactive contamination to be present. Basewide studies have also been performed for certain materials such as PCBs and asbestos-containing materials in buildings and structures, along with comprehensive evaluations of potentially contaminated steam lines, sewer, and storm drainage systems. These studies are described after the subsections describing the status of each parcel.

[285] Engineering /Remediation Resources Group, Inc., *Draft Feasibility Study Report for Parcel E,* July 2009; Engineering/Remediation Resources Group, *Draft Final Revised Remedial Investigation Feasibility Study Report for Parcel E-2,* February 1, 2009. These reports are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Current Conditions at HPS Parcel A

Parcel A consists of 75 acres, primarily on Hunters Point Hill and was formerly the residential area for the Shipyard. Parcel A contained 74 buildings, and the majority of the structures were former residences. Other buildings included storage, residential accessory structures, and administrative offices. Environmental investigations determined that site conditions posed no threat to human health or the environment. A No Further Action ROD was issued for Parcel A in 1995. Parcel A was deleted from the Superfund list in 1999. In December 2004, a Finding of Suitability to Transfer (FOST) for Parcel A was finalized, resulting in the transfer of Parcel A to the City.[286] The FOST for Parcel A described in detail the potential impact on future residents of Parcel A from the hazardous material release sites where remediation had not been completed on other adjacent parcels, particularly what is now Parcel E-2, and concluded that there would not be significant impacts on Parcel A from Parcel E-2 or other adjacent parcels at HPS.

Development underway on Parcel A is referred to as Phase I. Areas of Parcel A are within HPS Phase II, including portions of HPS Village Center and HPS South Districts.[287]

Current Conditions at HPS Parcel B

HPS Parcel B: Historic Uses

Parcel B was formerly part of the industrial support area and was used for fuel distribution, sandblasting, painting, machining, acid mixing, and metal fabrication, shipping, training, barracks, and offices. Other significant activities at Parcel B included potential disposal of decontamination materials from ships used during nuclear weapons testing in 1946 and 1947. Fill containing a high percentage of construction debris was placed on the northwestern side of Parcel B (an area known as IR Sites 7/18) during the expansion of the shipyard in the 1950s. In 1976, the Navy leased most of HPS, including all of the area now known as Parcel B, to Triple A. From 1945 through 1987, contaminant releases occurred during site operation under the Navy and Triple A; however, specific dates of releases are not known. Since 1986, portions of Parcel B have been leased for such uses as artists' studios, storage, and cabinet making. The 2008 Finding of Suitability to Lease (FOSL) provided for such uses.[288]

As reported in environmental investigation documents (refer to discussion below), about 75 to 80 percent of HPS ground surface is covered by pavement and buildings. There is no permanent surface water on Parcel B. Surface water runoff flows to the Bay via gravel-lined swales and/or percolates through surface soil during storm events. Groundwater at Parcel B consists of the A-Aquifer and the B-Aquifer, which are both shallow.

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[286] US Department of the Navy Base Realignment and Closure Program Management Office West, Finding of Suitability to Transfer for Parcel A (Revision 3) Final, Hunters Point Shipyard, San Francisco, California, October 14, 2004. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[287] Environmental requirements that ensure that the development of Parcel A is conducted in a manner that protects public health and safety have been, and will continue to be, guided by deed restrictions and the provisions of Article 31 of the San Francisco Municipal Code and associated plans. The deeds contain certain notice requirements related to motor oil in groundwater, asbestos building materials, and lead paint. Article 31 requires the Project Applicant to prepare dust control, off-site soil disposal, stormwater and erosion control plans and submit them to SFDPH for approval.

[288] The 2008 FOSL for Parcel B also included one building (Building 606) within Parcel D-1.

The A-Aquifer is not a source of drinking water. The B-Aquifer has never been used as a source of drinking water and has limited beneficial use. There is an extensive groundwater monitoring well network.

Parcel B: Results of Environmental Investigations

The primary chemicals in Parcel B soils at concentrations above cleanup goals are VOCs, semi-volatile organic compound (SVOCs),[289] PCBs, and metals. VOCs, chromium VI (hexavalent chromium), and mercury are the primary chemicals that have been detected in groundwater. The VOC plume has been the subject of a zero-valent iron (ZVI) injection treatability study and has been monitored for several years. Concentrations within the plume are decreasing as the result of ZVI injection during treatability study testing. Petroleum hydrocarbons have also been detected in Parcel B soil and groundwater. A survey in IR Sites 7/18 found methane present at concentrations that could potentially be explosive if vapors were to accumulate above levels of concern in a structure. The presence of methane may have been related to the construction debris placed there in the 1950s or a function of organic-rich Bay margin sediments, or a combination thereof.[290]

The original HHRA for Parcel B was conducted in 1996, followed by updates in 2003 and 2007 that accounted for ongoing cleanup and additional data gathering and evaluation. The 2007 assessment evaluated exposure scenarios for the individual metals and organic compounds that could present a risk for construction worker, residential, industrial, and recreational land uses. The assessment conservatively assumed these individuals could come into direct contact with soil, ingest it, or inhale dust containing the contaminants. Potential risks from groundwater are based primarily on breathing VOC vapors in indoor air that have migrated from groundwater in the A-aquifer.

The results of a screening-level ecological risk assessment (SLERA) identified potential unacceptable risk to benthic invertebrates, birds, and mammals from exposure to several metals (chromium VI, copper, lead, and mercury), pesticides, and PCBs in sediment along the shoreline.[291]

HPS Parcel B: Cleanup Status

The Navy has been performing basewide removal actions of radiological contamination to substantially eliminate identified pathways of exposure to radioactive contamination for surrounding populations and nearby ecosystems, such as nearby wetlands and the Bay. At Parcel B, the radiological cleanup activities have targeted radiologically impacted buildings, storm drains, and sanitary sewers. All waste material was

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[289] A semi-volatile organic compound (SVOC) is an organic chemical that readily, but only partially, evaporates or changes from a liquid to gas at temperatures normally found at the ground surface and at shallow depths.

[290] ChaduxTt and Tetra Tech, *Parcel B Technical Memorandum in Support of a Record of Decision Amendment*, Final, December 12, 2007; ChaduxTt and Tetra Tech, Amended *Parcel B Record of Decision Amendment*, January 14, 2009; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. These documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[291] ChaduxTt and Tetra Tech, *Parcel B Technical Memorandum in Support of a Record of Decision Amendment*, Final, December 12, 2007; ChaduxTt and Tetra Tech, Amended *Parcel B Record of Decision Amendment*, January 14, 2009; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

disposed at an appropriate off-site facility. In addition, the source of methane in IR Sites 7/18 has been remediated through excavation and groundwater monitoring, and documentation is pending.

In 1997, the Navy selected a remedial action for Parcel B, which was documented in a ROD. After performing detailed technical assessments over the last 10 years, including additional investigations, and a revised risk assessment, the Navy developed a proposed revised remedy. The revised approach takes into account updated information and includes items such as the ubiquitous nature of metals in soil across Parcel B as a function of the imported fill, the presence of methane and mercury, the findings of a SLERA, and findings from removal actions to address radiological contaminants.

The revised remedy was documented in a ROD Amendment, finalized in February 2009.[292] The ROD Amendment describes the reasons why the Navy selected the preferred alternative for cleaning up the soil and groundwater at Parcel B.[293] Some components of the revised remedy have been completed, such as the methane and mercury source removals. Other components are in progress, such as the radiological source removals (including radiologically impacted sewer and storm drain lines).[294]

The major components of the soil remedial actions are: excavating contaminated soil with off-site disposal, and covering with clean soil or other impervious surfaces such as pavement, concrete, or buildings; installing a soil vapor extraction system (SVE) to remove VOCs from soil and a soil vapor sampling program to evaluate the potential for vapor intrusion into buildings; constructing a shoreline revetment to protect ecological receptors along the Bay shoreline and to prevent or minimize wave-generated erosion from breaching the cover or cap; continuing the removal of radiologically contaminated building materials and soils; and implementation of Institutional Controls (ICs) to limit exposure to contaminated soil and groundwater by restricting specified land uses and activities on the parcel.[295] Figure III.K-2 (Parcel B Areas Requiring Institutional Controls) illustrates the Parcel B ICs.

The primary components of the groundwater cleanup consist of injecting a biological substrate to destroy VOCs in groundwater and monitoring, and water quality monitoring in the area of the mercury and methane source removals to evaluate the effectiveness of the removals in remediating mercury and methane in groundwater. ICs, such as prohibitions on the use of groundwater, would also be implemented.[296]

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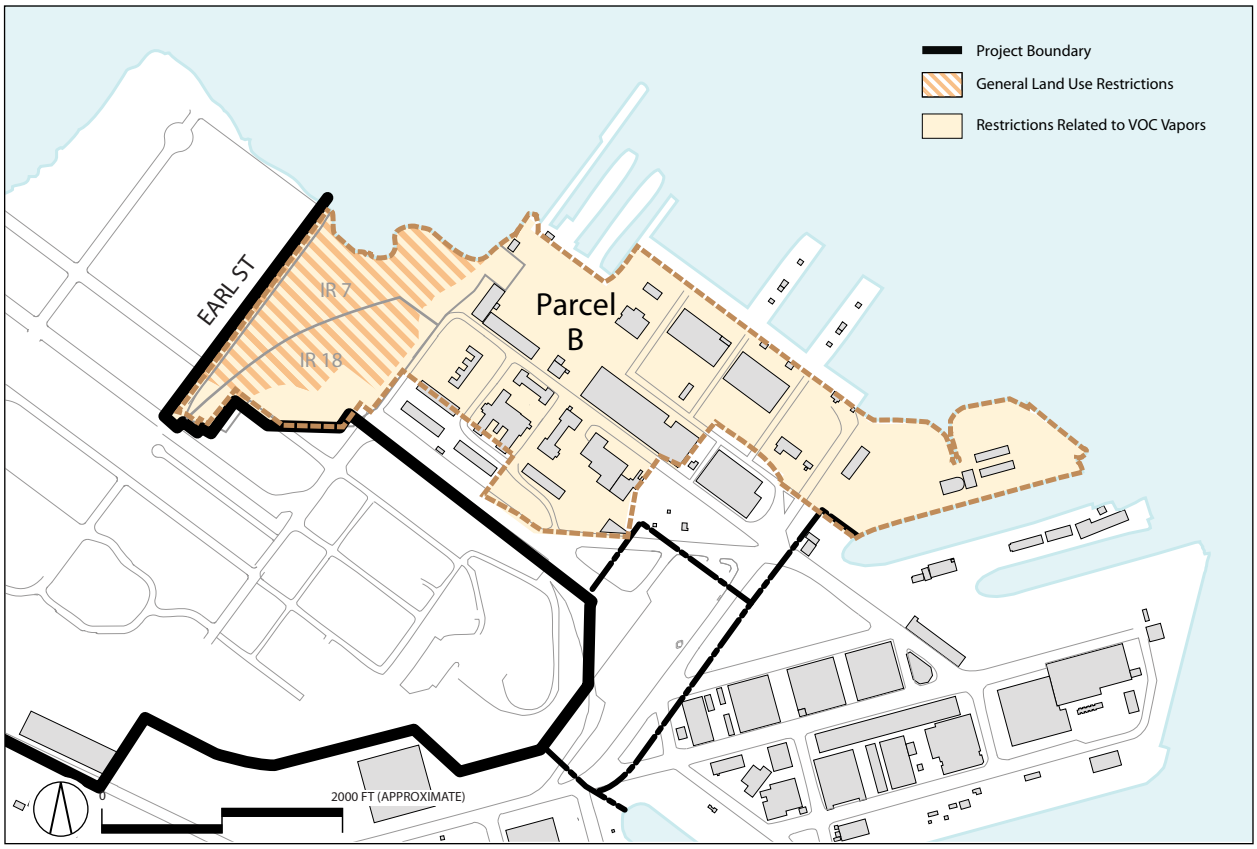
[292] Department of Navy, *Final Amended Record of Decision for Parcel B*, January 14, 2009. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[293] Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. This report is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[294] ChaduxTt and Tetra Tech, *Parcel B Technical Memorandum in Support of a Record of Decision Amendment*, Final, December 12, 2007; ChaduxTt and Tetra Tech, Amended *Parcel B Record of Decision Amendment*, January 14, 2009; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. This report is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[295] Ibid.

[296] Ibid.



SOURCE: Jonas & Associates, Inc. 2008.

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FIGURE III.K-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

PARCEL B AREAS REQUIRING INSTITUTIONAL CONTROLS

Radiological contamination in soil will be remediated through ongoing removal and off-site disposal of impacted storm drain and sewer lines and related affected soil, and through removal of contaminated materials at IR Sites 7/18 (if found to be present) to a specific depth. A demarcation layer will be installed across areas of IR 7/18 to mark the boundary between the existing surface and a new soil cap. All buildings, former building sites, and excavated areas across Parcel B would be surveyed after cleanup is completed to ensure no residual radioactivity above the remediation goals is present. Additionally, groundwater monitoring will be conducted at IR Sites 7/18 to confirm that radionuclides have not been released into groundwater. Finally, ICs would be implemented to minimize inadvertent contact with potentially radiologically impacted media. The ICs for radiological impacts would only be applicable to IR Sites 7/18, and potentially for an area deep beneath Building 140, where a culvert is located that may contain radioactive material. The other potentially radiologically impacted sites would be cleared for unrestricted radiological release (or free release) as decided by California Department of Public Health (CDPH). If buildings are found to contain radiologically impacted materials, the Navy will decommission (i.e., remediate radiologically impacted materials) and/or demolish that building.

A CAP was prepared to address petroleum releases at Parcel B.[297] A Work Plan to implement the Parcel B CAP has also been prepared.[298] The remediation of total petroleum hydrocarbons-impacted areas is being conducted primarily under the oversight of RWQCB. These activities are anticipated to be completed in early 2010.

In the above description of the remedy for Parcel B, the terms "cover" and "cap" are both used. Although these terms are sometimes used interchangeably in other contexts, in this EIR they refer to two similar, but distinct, types of remedies that are both designed to prevent exposure from known or suspected residual contaminants (also referred to as cutting off an exposure pathway).

The term "cover" as used in this EIR refers to a remedy requiring that the surface covers being installed (or remaining in place) to support the development (e.g., building slabs, pavement for roads, concrete for sidewalks, soil or grass for landscaped areas), meet certain specifications of thickness and be maintained to prevent breaches. The ICs imposed in conjunction with cover remedies generally contemplate that development activities will result in temporary breaches of the cover and allow such temporary breaches with the approval of the regulatory agency.

The term "cap" as used in this EIR refers to a remedy requiring the installation of a surface specifically engineered to be placed on top of an area of known or suspected residual contamination (typically a landfill); the surface may be asphalt, concrete, or soil, but is generally more robust than a "cover" remedy, includes a "demarcation layer" of some sort, is often accompanied with methane recovery or monitoring equipment, and more intensive operation and maintenance requirements than a "cover" remedy. The ICs imposed in conjunction with cap remedies generally make it more difficult to secure approval for a breach of the cap than the ICs for a cover remedy.

In the context of the Parcel B ROD, the soil remedy for IR sites 7/18 is referred to as a "cap," and the soil remedy for the remainder of the parcel is referred to as a "cover."

[297] Shaw Environmental, *Final Petroleum Hydrocarbon Corrective Action Plan, Parcel B, Revision 2008*, June 25, 2008.
[298] Innovative Technical Solutions, *Draft Project Work Plant, Petroleum Hydrocarbon Corrective Action, Parcel B,* March 2009.

The implementation and enforcement of ICs at Parcel B and other parcels is described in more detail under Section III.K.3 (Regulatory Framework).

Current Conditions at HPS Parcels C and UC-2

Parcels C and UC-2: Historic Uses

Parcel C is 76 acres of shoreline and lowland along the east-central portion of HPS. It is the oldest portion of the shipyard and has been used primarily for industrial operations since the late 1800s. Within the boundaries of Parcel C are 35 buildings, two drydocks, one wharf, nine ship berths, and one pier. Soil at Parcel C consists largely of artificial fill. As reported in the RI, asphalt, concrete, or buildings cover approximately 90 percent of the surface soil. Bedrock is in close to the surface in areas within Parcel C; hence its desirability for the construction of a drydock within competent material.

HPS Parcels C and UC-2: Results of Environmental Investigations

The primary chemical contaminants detected in Parcel C soil and groundwater include VOCs, SVOCs, PCBs, petroleum hydrocarbons (gasoline and diesel), and metals. Identified sources of these chemicals included leaking sumps containing VOCs and SVOCs, leaking fuel (gasoline and diesel) lines and USTs, sandblast material containing lead and other metals, and leaking PCB-containing transformers. Petroleum hydrocarbon and VOC plumes in groundwater occur in the eastern half and west-central portions of Parcel C. Ongoing quarterly groundwater monitoring indicates exceedances of water quality criteria by certain metals and VOCs. The current magnitude and extent of these chemicals in groundwater at Parcel C are generally consistent with previous quarters, with the exception of an increase recently of vinyl chloride levels in one monitoring well. The Parcel C HHRA indicates that there are areas that require remediation to meet acceptable risk levels for the future land uses as defined in the 1997 Agency Re-Use Plan.[299]

There is not a significant risk to terrestrial species because of the lack of ecological receptors at the site under current use; however, petroleum hydrocarbons in soil and groundwater pose a risk to aquatic receptors in the Bay.[300]

HPS Parcels C and UC-2: Cleanup Status

Numerous physical cleanup activities have been implemented at Parcels C and UC-2, including: removal of USTs and subsurface fuel lines; excavation and/or encapsulation of soil; collection and removal of sandblast waste; encapsulation of Drydock 4 waste drainage culverts by sealing all inlets and outlets to the culverts with concrete slurry, thereby, eliminating the pathways of exposure of ecological receptors to hazardous substances. In addition, groundwater treatability studies have been performed for VOCs, along with in-situ bioremediation, which have demonstrated reductions in VOC concentrations in soil and groundwater.[301] The Navy published a FS in 2008 as an update to the 1998 FS.[302] Nine remediation alternatives were identified in the FS, with the highest-rated alternative comprising a combination of soil excavation and off-site disposal, covers, soil vapor extraction for VOCs, in-situ groundwater treatment,

[299] SulTech. *Final Feasibility Study Report for Parcel C*, July 31, 2008.
[300] Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. SulTech *Final Feasibility Study Report for Parcel C*. July 31, 2008.
[301] Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008.
[302] SulTech, *Final Feasibility Study Report for Parcel C*, July 31, 2008.

and ICs. A draft PP outlining the Navy's preferred remedies was published in January 2009. A draft ROD identifying the selected remedy is expected to be issued in December 2009. The final ROD is expected to be signed in the winter of 2010.[303]

Current Conditions at HPS Parcel D (including newly created Parcels D-1, D-2, G, and UC-1)

HPS Parcel D: Historic Uses

The original Parcel D consisted of 101 acres of the southeast-central portion of HPS. Most of the land at Parcel D was formerly part of the industrial support area and was used for shipping, ship repair, and office and commercial activities. The docks at Parcel D were formerly part of the industrial production area. Segments of the basewide steam and sanitary sewer/storm drain system traverse the parcel. Portions of Parcel D were also used by the NRDL. As reported in the RI, approximately 85 percent of the ground surface in Parcel D is covered by pavement and buildings.

HPS Parcel D (Including D-1, D-2, G, and UC-1): Results of Investigations

The primary chemical contaminants detected in Parcel D soil include PCBs and petroleum hydrocarbons (diesel and motor oil), and metals. Diesel and motor oil were also detected in groundwater. Elevated concentrations of lead in soil were detected in several areas. Arsenic and beryllium were detected in both soil and groundwater. Other metals found in serpentinite-derived fill materials, such as arsenic, chromium, nickel, and manganese, were also detected throughout the parcel in soil and/or groundwater. Chromium VI (hexavalent chromium) was detected within groundwater below IR-09, the former pickling and plating yard. Cesium-137 and associated elements strontium and europium were detected on asphalt adjacent to the secondary containment vault behind Buildings 364 and 365. Groundwater monitoring has been conducted on a semi-annual basis across Parcel D. Based on data collected as part of the Groundwater Treatability Study in 2008, the primary chemicals of concern continue to be metals and VOCs. However, VOC concentrations have decreased, and VOC and hexavalent and total chromium concentrations continue to decline as a result of the in-situ treatment (conducted as part of the treatability study, as discussed in more detail below).

Metals (arsenic, lead, manganese) and a few VOCs are the primary contaminants in soil requiring the need for remediation. The following chemical contaminants in groundwater are associated with potential exposure to A-aquifer groundwater via vapor intrusion: benzene, carbon tetrachloride, chloroform, naphthalene, tetrachlorethene, trichloroethene, xylene, and methylene chloride. The completed ecological risk evaluations concluded potential exposure pathways (dermal contact and ingestion of contaminated soil) did not pose a significant risk because of the lack of ecological receptors at the site.[304]

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[303] California Department of Toxic Substances Control EnviroStor website: Hunters Point Naval Shipyard Parcel C. http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_ id=38440003.

[304] SulTech, *Final Revised Feasibility Study for Parcel D Hunters Point Shipyard, San Francisco*, November 30, 2007; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. These documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

HPS Parcel D (Including D-1, D-2, G, and UC-1): Cleanup Status

Several remediation activities have been implemented at Parcel D: removal of PCB-contaminated soil; removal of USTs and associated pipelines; collection and removal of sandblast waste; excavation of radiologically contaminated soil; and removal of contaminated sediment from storm drain lines.

The Navy revised the Parcel D FS in 2007, and prepared a draft PP for Parcel D that presented a proposal for remedial action to be selected in the ROD for Parcel D. It includes all of Parcel D, but for remedy selection, Parcel D was divided into four new parcels: Parcels D-l, D-2, G, and UC-l. Three RODs were prepared: one combined ROD for Parcels D-1 and UC-l and one each for Parcel D-2 and Parcel G. The Navy issued a ROD for Parcel G in February 2009[305] and a ROD for D-1 and UC-1 in July 2009.[306] In the fall of 2009 the Navy is planning to finalize a No Action ROD for Parcel D-2.[307]

The Navy is proposing the following actions in Parcels D-1, G, and UC-1: excavation and off-site disposal of contaminated soils and installing soil covers; treating groundwater at specific locations by injecting chemicals or biological nutrients to break down the chemicals, along with groundwater monitoring; continuing the removal of radiologically contaminated building materials and soils.[308] Similar to Parcel B, ICs will be used to implement land use restrictions to limit potential exposure of future landowner(s) and user(s) to hazardous substances present in Parcels D-1, G, and UC-1, and to ensure the integrity of the remedial actions (refer to Figure III.K-3 [Parcels D and G Areas Requiring Institutional Controls]).

Current Conditions at HPS Parcels E and E-2

HPS Parcels E and E-2: Historic Uses

In September 2004, the Navy divided the original Parcel E into two parcels: Parcel E and Parcel E-2. Parcel E consists of 138 acres of shoreline and lowland area in the southern portion of HPS. Nearly all of the Parcel E land area was created using artificial fill. Most of Parcel E is covered by annual grasses; the rest is covered by asphalt, buildings, or other structures used in light-industrial operations related to ship repair. Historically, Parcel E was a mixed-use and industrial area that supported HPS shipping and ship repair activities. Areas near the shoreline were used to store construction and industrial materials and to dispose of industrial waste and construction debris. Portions of Parcel E were also used for office and laboratory space by the NRDL.

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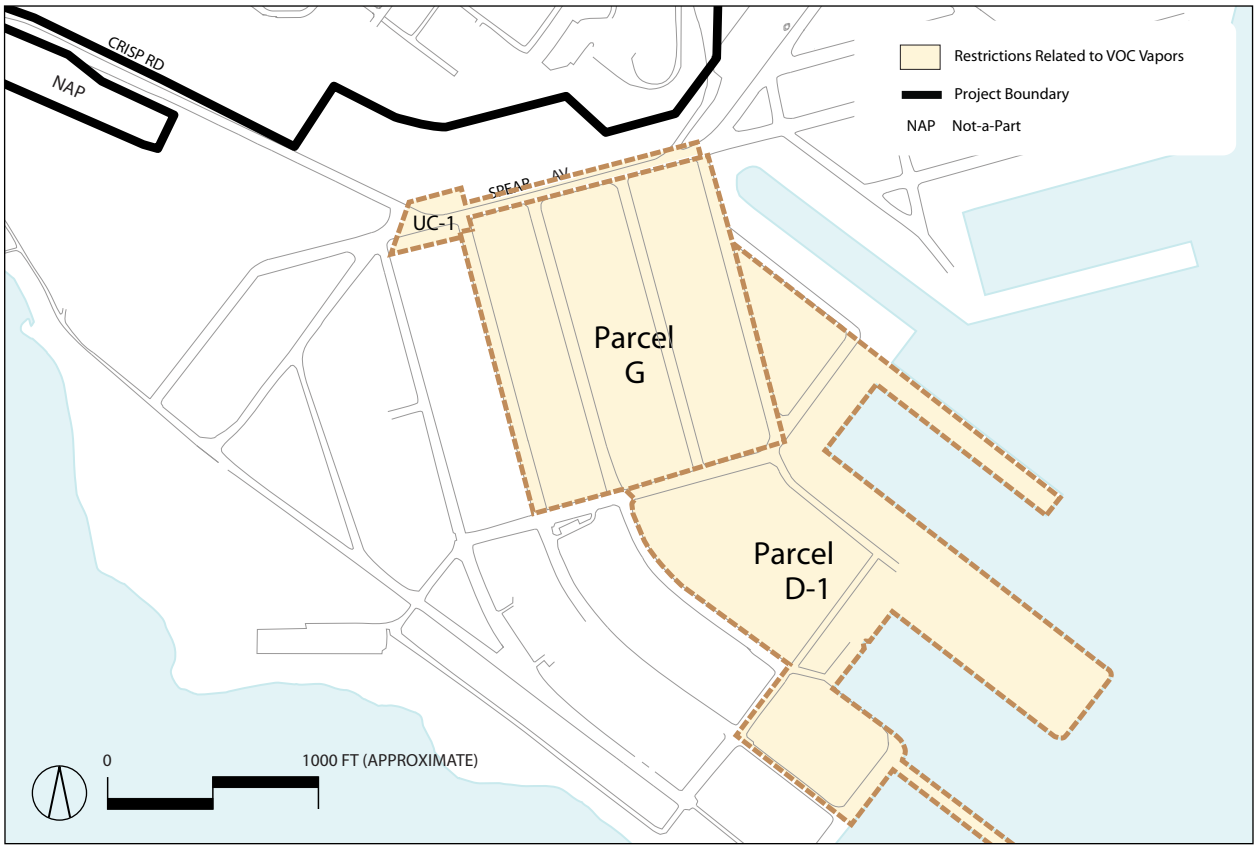
305 Department of Navy, *Final Record of Decision for Parcel G*, February 18, 2009. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

306 Department of Navy, *Final Record of Decision for Parcels D-1 and UC-1*, July 24, 2009. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

307 Department of Navy, *Draft Final Record of Decision for No Action at Parcel D-2*, 16 January 2009.

308 BRAC PMO, *Hunters Point Shipyard Parcel D Draft Proposed Plan Fact Sheet*, July 2008. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.



SOURCE: Jonas & Associates, Inc. 2008.

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FIGURE III.K-3

Candlestick Point — Hunters Point Shipyard Phase II EIR

PARCELS D AND G AREAS REQUIRING INSTITUTIONAL CONTROLS

Parcel E-2 consists of 47.4 acres of shoreline and lowland areas along the southwestern portion of HPS Phase II and is part of an area created from the 1940s to the 1960s by filling in the Bay margin with a variety of material, including soil, crushed bedrock, dredged sediments, and debris. From 1958 to 1974, the landfill received liquid chemical waste, asbestos, domestic wastes and refuse, dredge spoil materials, sandblast grit, solvent wastes, and low-level radioactive wastes from shipboard radium dials, including electronic equipment.

HPS Parcels E and E-2: Results of Investigations

The chemicals of concern at Parcel E include metals and organic chemicals such as VOCs, PAHs, PCBs, and pesticides. The chemicals of concern at Parcel E-2 include metals, PCBs, SVOCs, pesticides, and petroleum hydrocarbons. The radionuclides of concern associated with Parcel E-2 include cobalt-60, cesium-137, radium-226, and strontium-90.

The HHRA results for groundwater indicated that the risk from potential exposure to VOCs (such as chlorinated solvents and benzene) in the A-aquifer via vapor intrusion exceeded action levels at certain locations. The risk assessment also evaluated potential risks from exposure to chemicals in the B-aquifer from domestic use. The chemicals driving risk in B-aquifer groundwater are metals and VOCs. Potential human health risk from exposure to chemicals present in sediment was also evaluated for the shoreline at HPS. Based on this evaluation, hexavalent chromium (chromium VI), total chromium, and PCBs appear to be the primary chemicals of concern for the evaluation of human health in sediment along the Parcel E shoreline.

Two ecological risk assessments were performed for Parcel E: (1) the baseline ecological risk assessment (BERA), prepared in 1997, which evaluated risks from exposure to soil in areas planned for open space reuse along the Parcel E shoreline; and (2) a screening level ecological risk assessment (SLERA), prepared in 2005, which evaluated risks from exposure to sediment in the intertidal zone along the Parcel E-2 shoreline. The BERA found potential risk to birds and mammals from exposure to copper, lead, and total PCBs in soil along the shoreline. The SLERA found potential risk to benthic invertebrates, birds, and mammals from exposure to metals and total PCBs in surface and subsurface sediments along the shoreline.[309] Although the SLERA was characterized as an assessment of Parcels E/E-2, these sediments posing risk to ecological receptors are actually part of the Parcel F submerged lands because the boundary between Parcels E and E-2 is defined in a manner that makes all sediments part of Parcel F.

HPS Parcels E and E-2: Cleanup Status

Numerous physical cleanup activities have been implemented at Parcels E and E-2. These include: collection and removal of 5,000 tons of sandblast waste; removal and containment of floating petroleum product to prevent further migration to the Bay; a SVE system to extract VOCs from the subsurface; excavation and removal of soil contaminated with PCBs, removal and/or containment of radioactive

[309] Barajas and Associates, *Final Revised Remedial Investigation Report for Parcel E Hunters Point Shipyard*, May 2, 2008; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008; Engineering/Remediation Resources Group, *Draft Final Remedial Investigation /Feasibility Study Report for Parcel E-2, February 1, 2009*. These documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

constituents; and petroleum compounds; removal of contaminated soil and placement of a clean soil cap in the metal debris reef and metal slag areas.

In Parcel E-2, the Navy has installed a groundwater containment and extraction system at the southeast portion of the landfill to reduce the potential for release of chemical constituents into the Bay. This system includes sheet piling and a groundwater extraction system to control potential mounding of shallow groundwater at the southern end of the landfill. A multi-layer interim cap was constructed on a portion of the Parcel E-2 Landfill to prevent oxygen intrusion and extinguish smoldering subsurface areas following a subsurface fire that burned for several months in 2000. Following characterization of the nature and extent of landfill gas, a landfill gas barrier and monitoring system was constructed at the northern end of the landfill to prevent methane gas migration from reaching the University of California San Francisco (UCSF) facility adjacent to parcel E-2 (the UCSF facility is outside of HPS Phase II). In addition, ongoing monitoring programs at Parcel E-2 include Storm Water Discharge Management Program; Landfill Cover Inspection and Maintenance Program; Basewide Groundwater Monitoring Program; and Landfill Gas Control and Monitoring Program.[310,311]

Before the PPs and RODs can be completed for Parcels E and E-2, a methane gas survey must be completed at Parcel E-2, and a groundwater treatability study is planned for Parcel E-2.[312] In addition, the HHRA has been revised, and an updated draft Parcel E FS was prepared. For Parcel E-2, the range of cleanup options includes: excavation and off-site disposal of solid waste, soil, and sediment (including monitoring and institutional controls); or on-site containment of solid waste, soil, and sediment with Hot Spot Removal (including monitoring and institutional controls or some combination thereof). [313]

The draft PPs and RODs for E and E-2 are expected in the 2010–2011 timeframe. Remedial design plans and completion reports will be developed and are anticipated in the 2012–2014 timeframe.[314]

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[310] Barajas and Associates, *Final Revised Remedial Investigation Report for Parcel E Hunters Point Shipyard,* May 2, 2008; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008; Engineering/Remediation Resources Group, *Draft Final Revised Remedial Investigation Feasibility Study Report for Parcel E-2, February 1, 2009*. These reports are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[311] Innovative Technical Solutions, *Landfill Gas Monitoring Report Post-Removal Action, Parcel E-2 Industrial Landfill, Hunters Point Shipyard*, November 2, 2007. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[312]Shaw Environmental, Inc., Draft Work Plan, Methane Gas Survey, Parcel E-2 Panhandle Area, Hunters Point Shipyard, April 15, 2009. Shaw Environmental, Inc., Final Work Plan, Parcel E Groundwater Treatability Study, Hunters Point Shipyard, July 27, 2009.

[313] Engineering /Remediation Resources Group, Inc., *Draft Feasibility Study Report for Parcel E,* July 2009.

[314] California Department of Toxic Substances Control EnviroStor website. Hunters Point Naval Shipyard Parcel E/E-2. http://www.envirostor.dtsc.ca.gov/public/profile_report (accessed July 2009).

Current Conditions at HPS Parcel F

HPS Parcel F: Historic Uses

Parcel F comprises 446 acres of underwater property[315] surrounding all portions of HPS to the north, east, south, and southwest. Figure III.K-4 (Hunters Point Shipyard Phase II Parcel F Subareas) shows Parcel F in relation to the other parcels and five specific investigation subareas within the parcel. Features of Parcel F include pier, slip, and drydock areas and offshore sediment. As noted for Parcel E/E-2, the sediments are included as part of the Parcel F submerged lands because the boundary between Parcels E and E-2 is defined in a manner that makes all sediments part of Parcel F.

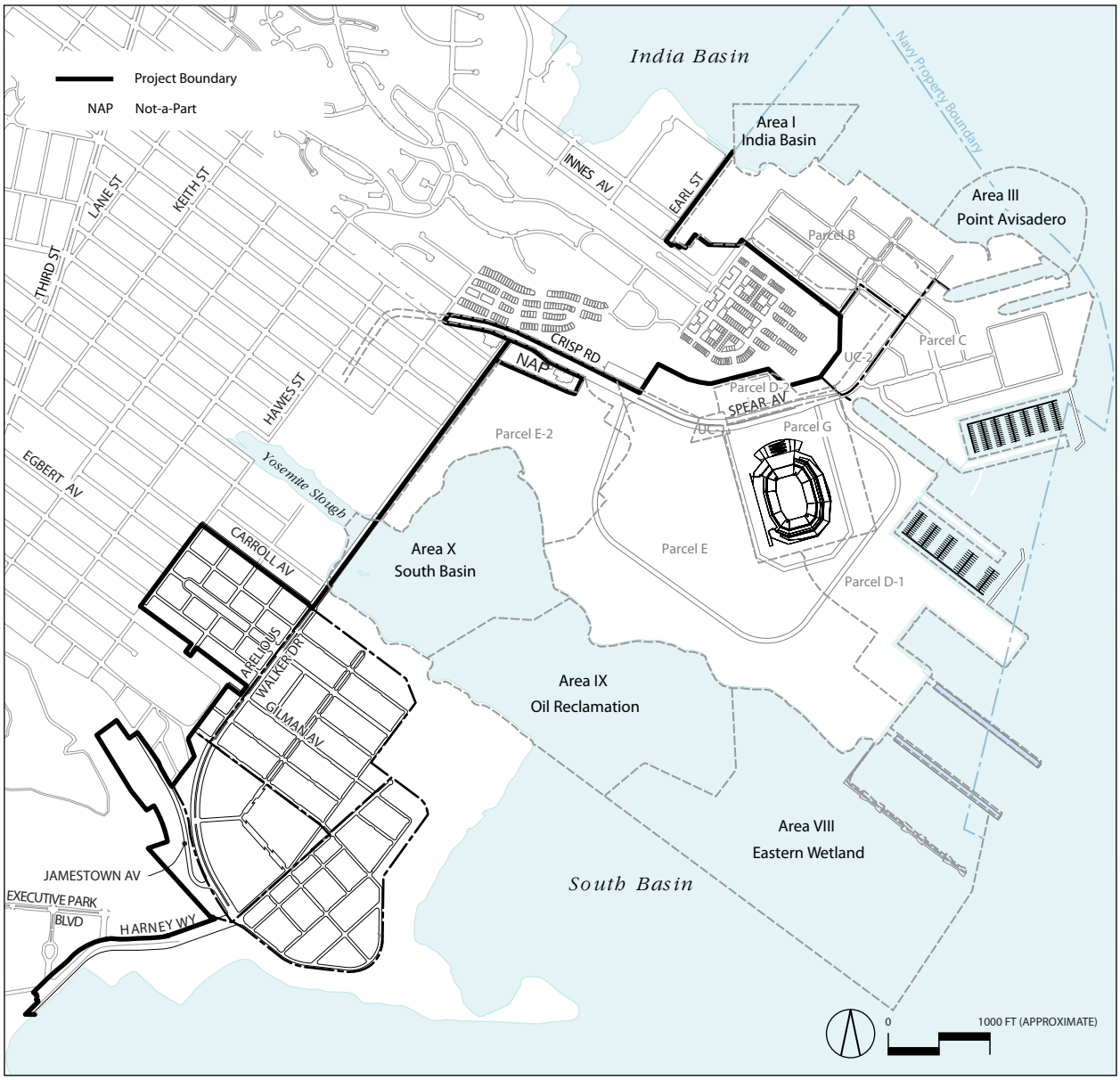
HPS Parcel F: Results of Environmental Investigations

Numerous investigations have been conducted at Parcel F. The investigations include an RI/FS, a human health risk assessment, and an updated FS, as well as the collection of surface and subsurface sediment samples for chemical and ecological toxicity evaluations. Fish and invertebrate tissue samples also were collected at Parcel F and analyzed for chemicals. During Phase 1A and Phase 1B Ecological Risk Assessments, Parcel F was subdivided into eleven subareas. Based on the previous investigation results, five areas were identified for further evaluation: Area I (India Basin Subarea), Area III (Point Avisadero Subarea), Area VIII (Eastern Wetland Subarea), Area IX (Oil Reclamation Subarea), and Area X (South Basin Subarea), which are shown in Figure III.K-4. Although no final determination has been made, at this time no further evaluation of the sediment is considered to be necessary for the remaining subareas.

The India Basin Subarea I of Parcel F is north of Drydocks 5, 6, and 7. Subarea III (Point Avisadero) is between Pier C and Drydock 3. Subareas VIII, IX, and X (Eastern Wetland, Oil Reclamation, and South Basin, respectively) adjoin Parcels E and E-2 on the west side of HPS Phase II. The location for the proposed marina is within Parcel F, but it is not within one of the subareas for which further evaluation has been recommended.

The results of a shoreline investigation in 2002 evaluated whether contamination in Parcels E and E-2 had the potential to migrate (or had migrated) to sediments in the adjacent offshore area of Parcel F, or to affect benthic invertebrates, birds, and mammals in the shoreline area. In Subarea III, copper and mercury were identified as the primary risk drivers; PCBs were of greatest concern in Subareas IX and X. These chemicals also exceeded concentrations considered safe for benthic invertebrates directly exposed to sediment. PCBs also were shown to cause potential risk to humans if they were to consume shellfish collected at HPS. Although the issue of concentration of chemicals in fish is regional, the study also evaluated whether differences existed between levels of chemicals in fish from the vicinity of HPS and those collected elsewhere in the Bay. Results of statistical comparisons of fish tissue data at HPS indicated

[315] Barajas and Associates, *Final Feasibility Study Report for Parcel F,* April 30, 2008. This report is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.



SOURCE: Moffatt & Nichol Engineers, Lennar Urban, RHAA, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

HUNTERS POINT SHIPYARD PHASE II PARCEL F SUBAREAS

FIGURE III.K-4

the results were statistically similar to regional levels.[316] No unacceptable ecological risk was indicated by sediments in Subareas I (India Basin) or VIII (Eastern Wetland).

HPS Parcel F: Cleanup Status

The Navy has implemented source control measures to help reduce contaminant levels including: extensive removal of contaminated soil, and sediment and debris along the Parcels B, E, and E-2 shorelines; storm drain cleaning program; and installation of a steel sheet-pile wall on the Bay side of the former industrial landfill located in Parcel E-2. A revised Parcel F FS has identified a range of alternatives to remediate Parcel F, the offshore areas of the Shipyard. For Subarea III, the options include removal/backfill and off-site disposal of affected media in combination with a cap and institutional controls. For Subareas IX/X, similar methods could be used, along with in-situ stabilization and natural recovery with monitoring. (For Subareas I and VIII, no remedial actions were recommended by the Navy as being necessary because no unacceptable ecological risk was identified.) The Navy will select the preferred remedial alternative after receipt and resolution of regulatory agency comments. The Navy will present its preferred alternative to the public in a PP.[317] The draft PP and ROD are anticipated to be issued in 2012 or 2013.[318]

Basewide Environmental Investigations at HPS

Basewide Historical Radiological Assessment

HPS has been the subject of many radiological investigations, with particular focus on ionizing radiation. In 2000, the Navy began preparing a basewide assessment of the *potential* for radiological contamination in the buildings and environmental media. The preparation of the Historical Radiological Assessment 1939-2003 (HRA) was an extended process that involved review of thousands of records from 14 federal and private records repositories, electronic mail, and telephone contact with 200 persons with potential knowledge of radiological operations at HPS.

The primary purpose of the HRA was to designate sites as "impacted" or "non-impacted." As identified in the HRA, an impacted site was one that had the potential for radioactive contamination based on historical information, or was known to contain or have contained radioactive contamination. Designation as "impacted" did not confirm that radioactive contamination was present; only that the possibility existed and

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316 Health concerns associated with fish consumption in San Francisco Bay is a regional issue. Concentrations of six chemicals or groups—including mercury, PCBs, dioxins, dieldrin, DDT, and chlordane in fish collected throughout the San Francisco Bay—are elevated enough to pose a potential risk to recreational anglers and have resulted in health advisory warnings.
Barajas and Associates, *Final Feasibility Study Report for Parcel F Hunters Point Shipyard,* April 30. 2008; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. These documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

317 Barajas and Associates, *Final Feasibility Study Report for Parcel F Hunters Point Shipyard,* April 30. 2008; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. These documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

318 California Department of Toxic Substances Control EnviroStor website: Hunters Point Naval Shipyard Parcel F. http://www.envirostor.dtsc.ca.gov/public/profile_report (accessed July 2009).

needed to be investigated. Non-impacted sites are those with no history of radiological operations or those that have no reasonable potential for residual contamination (such as residential or administrative buildings).

Of the 882 HPS historical and current sites and support areas identified in the HRA, 91 were identified as "impacted." The impacted sites included: buildings; drydocks; former building sites; outdoor areas; IR sites, ships' berths; the Gun Mole Pier (re-gunning pier); and septic, sanitary, and storm drain systems. Of the 91 sites, 29 were recommended for review of the Final Status Survey; these sites can be recommended for free release only when the Navy and appropriate regulatory agencies have reviewed the Final Status Survey report and agreed with the assessment. Sixty impacted sites were recommended for further investigative actions or remediation. The HRA identified the following potentially contaminated media: surface soils, subsurface soil and media, structures and drainage systems. The assessment concluded, however, that there was no concern for airborne contamination from the potentially contaminated media in their undisturbed state, and no defined impacted site was recommended for emergency action. Eleven impacted sites required restricted access until the completion of remedial activities as a result of the presence of known levels of undisturbed radioactive contamination.

The overall conclusion of the HRA was that although low levels of radioactive contamination exist at HPS, no imminent threat or substantial risk exists to tenants, the environment of HPS, or the local community.[319] This conclusion has been reinforced by subsequent Finding of Suitability for Lease (FOSL)[320] issued by the Navy for areas in Parcel B and Building 606 in Parcel D and approved by the regulatory agencies authorizing leases for various uses involving hundreds of employees, artists, and visitors in close proximity to various "impacted" sites each day. A Basewide Radiological Work Plan was subsequently prepared, describing survey and decontamination approaches to be implemented in support of radiological release of buildings and areas.[321]

Other Basewide Investigations for Specific Contaminants at HPS

In addition to the radiological investigations and cleanups, other Navy efforts include basewide investigation and remediation for PCBs, asbestos containing building materials (ACBM), underground and aboveground storage tanks (ASTs). Transformers containing PCBs have been removed, but investigation of soils for PCB contamination has been addressed separately for each parcel. The Navy has conducted building surveys for asbestos and has removed some hazardous ACBM in all parcels except the Parcel F submerged lands where there are no buildings. The Navy investigated USTs and removed or closed them in place in two phases in the 1990s. Most of the USTs contained petroleum products, waste oils, or solvents. The Navy also has removed numerous ASTs. Most of the ASTs contained petroleum products or water, except for two that contained solvents. For both USTs and ASTs, associated contaminated soils

[319] US Department of the Navy, *Hunters Point Shipyard Final Historical Radiological Assessment History of the Use of General Radioactive Materials 1939–2003*, August 2004. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[320] MACTEC Engineering and Consulting, Inc., Final Finding of Suitability to Lease Buildings 103, 104, 115, 116, 117, 120, 125, and 606 Open Spaces 1 and 2, Hunters Point Shipyard February 4, 2008.
[321] Tetra Tech, *Basewide Radiological Work Plan, Revision 1*, October 5, 2007.

have been removed and disposed of off site.[322] As part of the implementation of the remedies set forth in each Parcel's ROD and petroleum Corrective Action Plan, all releases associated with ASTs or USTs will be addressed and determined by the FFA Signatories to be safe for the intended use.

Hazardous Building Materials: Current Conditions

Hazardous building materials include asbestos-containing building materials, electrical equipment such as transformers and fluorescent light ballasts that may contain PCBs, fluorescent lights and switches containing mercury, and lead-based paints. Until the 1970s, asbestos was commonly used in building materials, including use in insulation materials, shingles and siding, roofing felt, floor tiles, brake linings, and acoustical ceiling material. Asbestos is a known carcinogen and presents a public health hazard if it is present in friable (easily crumbled) form. PCBs were commonly manufactured and used in the United States between 1929 and 1977 for use in devices such as electrical transformers and capacitors and fluorescent light ballasts. Spent fluorescent light tubes commonly contain mercury vapors at levels high enough to be considered a hazardous waste under California law; depending on the levels of mercury present, the light tubes may also be classified as hazardous under federal law. Lead-based paint was commonly used prior to 1960 and is likely present in buildings constructed prior to 1960. The Department of Defense assumes that any military building constructed or rehabilitated prior to 1978 contains lead-based paint. Lead is toxic to humans, particularly young children, and can cause a range of human health effects depending on the level of exposure.

The investigation of some hazardous materials in buildings and structures in HPS Phase II has been completed by the Navy for parcels within the site. As described previously, damaged or friable asbestos and PCBs have been removed. However, lead-based paint surveys have not been completed for structures in Parcels B, C, D/G, and E.

Project-wide Current Conditions

This section describes Project-wide hazards and hazardous materials conditions such as naturally occurring asbestos, conditions at off-site locations, hazardous materials use on the Project site, and proximity to schools.

Naturally Occurring Asbestos

Asbestos is a naturally occurring mineral found in serpentinite rocks. As shown in Figure III.L-1 (Geologic Map) of Section III.L, there is an area of serpentinite mapped in the northern part of HPS Phase II, which extends north into the India Basin area. Serpentinite may also underlie proposed roadway segment locations in these areas. Previously disturbed serpentinite fragments have also been identified in fill material at HPS Phase II.

Rock types within Candlestick Point are predominantly Franciscan chert, slope debris, ravine fill, and undifferentiated sedimentary deposits. There is no mapped serpentinite within the boundaries of Candlestick Point or locations to the west where proposed roadway improvements could be constructed.

[322] Hunters Point Shipyard Reuse Final EIR, June 2000, pp.3-111 to 3-114. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Off-Site Hazardous Materials Release Sites

One site northeast of HPS Phase II is listed on the EnviroStor database and has been the subject of ongoing investigation for contaminated groundwater. The Bayview Plume Study Area is bounded on the west by Keith Street, on the north by Quesada Avenue, on the east by Griffith Street, and on the south by Shafter Avenue. Groundwater is affected with a dry-cleaning solvent (PCE), but results of remedial investigations show that the direction of groundwater flow is towards the northwest, away from the Project site.[323]

Conditions at Off-Site Improvement Locations

The Site History/Initial Site Assessment technical report prepared for the Bayview Transportation Improvements Project (currently under environmental review) reviewed environmental conditions at most of the locations where the off-site improvements (e.g., roadways) may involve disturbance of soil or the existing asphalt cover.[324] At Griffith Street, Ingalls Street, and Carroll Avenue, the report concluded that historic and current land uses indicate the potential for hazardous substances to have been released at some locations, indicating the potential presence of hazardous materials in soil and groundwater in these areas. The proposed segment along Palou Avenue was not included in the Site History/Initial Site Assessment technical report prepared for the Bayview Transportation Improvements Project (currently under environemental review), however, so conditions are not known.

Previous investigations that identified historic uses, USTs, and sampling results along the alignments, along with a review of agency databases, show that many of the locations identified in the above-referenced Site History/Initial Site Assessment report have received regulatory closure.[325] However, some sites may still require investigation or remediation, and there may be new sites that have not been comprehensively evaluated for the presence of hazardous materials contamination in soil at the specific locations where soil disturbance could occur.

Hazardous Materials Use and Hazardous Waste

Section III.B. (Land Use and Plans) describes the current land uses within the Project site. There are no industrial, manufacturing/processing, or similar large-scale businesses that routinely use, store, or transport substantial quantities of hazardous materials in the Project site. Limited quantities of household-type products containing hazardous materials such as cleaning agents, paints/solvents, and pesticides are associated with residential uses in Alice Griffith Public Housing and Candlestick Park Stadium operations.

Several former Navy buildings within HPS Phase II are leased to artists and woodworking and picture framing businesses. Some art materials and items used in woodworking contain hazardous materials, but the quantities on site are minimal. As a condition of their leasing agreements, tenants are responsible for the management and

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[323] California Department of Toxic Substances Control EnviroStor website: Bayview Plume Study Area. http://www.envirostor.dtsc.ca.gov/public (accessed July 2009). State Water Resources Control Board Geotracker website. http://geotracker.swrcb.ca.gov/ (accessed July 2009).

[324] BASELINE Environmental, Bayview Transportation Improvements Project, Technical Report, Site History/Initial Site Assessment, June 2009.

[325] California Department of Toxic Substances Control EnviroStor website. http://www.envirostor.dtsc.ca.gov/public (accessed July 2009). State Water Resources Control Board Geotracker. http://geotracker.swrcb.ca.gov/ (accessed July 2009).

appropriate disposal of their hazardous materials and wastes. Tenants are required to comply with all applicable laws and regulations pertaining to the use, transport, storage, and disposal of these materials.

According to information compiled for the Bayview Hunters Point Redevelopment Plan EIR and a review of agency databases in 2009,[326] there is one business with a reported address within the Project site that generates hazardous waste and that is regulated by the USEPA. It is a "small quantity generator" as defined by the USEPA, meaning it generates from approximately 220 to 2,200 pounds of hazardous waste per month, and is required to report hazardous waste quantities in accordance with *Resource Conservation and Recovery Act* (RCRA) requirements.

Schools within One-Quarter Mile of the Project

There are two schools within one-quarter mile of some portions of the Project. The Bret Harte Elementary School at 1035 Gilman Street is within one-quarter mile of the Alice Griffith public housing development. Muhammad University of Islam, a year-round elementary school, is located adjacent to the Hillside portion of HPS Phase I development and is within one-quarter mile of the western-most portion of the Project boundary. Another school in the Project vicinity, Gloria R. Davis Academic Middle School (1195 Hudson Avenue), is more than one-quarter mile from the Project.

Regulatory Process for Cleanup Process at HPS Phase II

The oversight of hazardous materials release sites often involves several different agencies that may have overlapping authority and jurisdiction. The DTSC and RWQCB are the two primary state agencies responsible for issues pertaining to hazardous materials release sites.

This section describes regulatory issues that are unique to the cleanup at HPS Phase II and summarizes the primary regulations pertaining to the types of investigation, cleanup, and construction activities that would occur in the Project. This section also describes the general regulatory framework applicable to hazardous materials throughout the Project site.

The general regulatory framework governing cleanup at closed military bases on the NPL like HPS Phase II is described in Section III.K.2 (Setting). The two subsections below describe two specific aspects of the regulatory framework at closed military bases on the NPL: the legal relationship between the cleanup process and the transfer of property at a closed military base; and the establishment and enforcement of institutional controls. In addition, this section notes two considerations, outside the normal regulatory framework applicable to cleanup and redevelopment at contaminated closed military bases that are unique to HPS Phase II.

First, on November 7, 2000, the voters of San Francisco voted to approve Proposition P, which called upon the Navy to remediate HPS to the highest levels practical to ensure flexible reuse of the property. On July 30, 2001, the Board of Supervisors approved a resolution confirming as the policy of the City and

[326] California Department of Toxic Substances Control EnviroStor website. http://www.envirostor.dtsc.ca.gov/public (accessed July 2009). State Water Resources Control Board Geotracker. http://geotracker.swrcb.ca.gov/ (accessed July 2009).

County of San Francisco that the Hunters Point Naval Shipyard should be cleaned of toxic and hazardous pollution by the Navy to the highest practical level.

Second, on March 31, 2004, the San Francisco Redevelopment Agency (Agency) and the United States Navy entered into a Conveyance Agreement for Hunters Point Naval Shipyard (HPS Conveyance Agreement). Under the HPS Conveyance Agreement, one of the "closing conditions" for conveying a parcel at HPS from the Navy to the Agency is that the Navy obtain Regulator Assurances prior to conveyance. That term is defined in the Conveyance Agreement to mean written confirmation by the USEPA, DTSC, and the RWQCB that sufficient remedial action has been taken to protect human health and the environment for the parcel's intended future use.

Legal Relationship between the Cleanup Process and Property Transfer at Hunters Point Shipyard

CERCLA requires that, prior to real property conveyance, the Navy must remediate hazardous substances to a level consistent with the protection of human health and the environment; or, if conveying property before completion of remediation, the Navy must ensure that the property is suitable for conveyance for the use intended and that the intended use is consistent with the protection of human health and the environment. In other words, there are two ways in which the Navy can transfer title to the HPS property: (1) after complete remediation of a parcel (e.g., the approach taken with Parcel A) or (2) or as an early transfer before remediation is completed. In addition, the Navy can lease the property before remediation is complete. The conditions associated with title transfers or leases are summarized below.

Transfer After Completion of Cleanup at HPS

The first option for title transfer assumes that all remediation necessary to protect human health and the environment has been conducted on the property. In conveying property that is completely remediated, the Navy documents its findings in a Finding of Suitability to Transfer (FOST).

The FOST would document environmental findings regarding the proposed transfer. It would summarize the environmental condition of the property and, where appropriate, identify any environmental conditions that would pose constraints to activities or uses of the property. It would identify any environmental covenants, conditions, or restrictions that would be included in the deed to ensure protection of human health and the environment, taking into consideration the agreed-upon land uses. Under CERCLA, the deed must contain a notice of the type and quantity of and timeframe in which hazardous substances were stored, disposed, or released on the property and any remedial action taken. The deed must warrant that all remedial action necessary to protect human health and the environment with respect to any remaining hazardous substances has been taken before transfer. Additionally, the deed must warrant that any remedial action found necessary with respect to such hazardous substances after the transfer will be taken by the Navy. At the time of transfer, the Navy is required to covenant that all required remediation has been completed and that if additional remedial action is needed with respect to contaminants on the property at the time of transfer, further cleanup will be the Navy's responsibility. The HPS Conveyance Agreement also requires federal and state environmental regulator concurrence prior to conveyance of a parcel at HPS.

Neither CERCLA nor Department of Defense policy nor regulations require federal or state environmental regulators to concur in the Navy's Finding of Suitability for Transfer; however, as described above, the HPS Conveyance Agreement in essence requires such concurrence prior to conveyance of a parcel at HPS.

Transfer Before Completion of Cleanup (Early Transfer) at HPS Phase II

The second way the Navy can convey title to property at HPS Phase II is a process referred to as "early transfer." This means that title would transfer from the Navy to the Agency before all necessary remedial action has been completed, provided certain conditions specified in CERCLA have been met. These conditions include the following:

- Agreement by USEPA and the State that the property is suitable for the intended use of the property during the completion of the remediation activities, and that the intended use will be protective of human health and the environment;
- Public notice and comment;
- Property use restrictions, if necessary, to ensure that human health and the environment are protected and that the necessary remedial actions can take place; and
- Assurances from the federal government that conveyance of the property will not substantially delay response actions at the property and that the necessary response actions will be completed after conveyance.

The Navy would document its determination that the property may be transferred prior to the completion of all remediation in a Finding of Suitability for Early Transfer (FOSET). For an early transfer to proceed at an NPL site like HPS Phase II, the USEPA, with the concurrence of the Governor of the state of California, must authorize the early transfer. Under CERCLA, USEPA and the Governor may authorize an early transfer only if each determines that:

- The property is suitable for transfer for the use intended by the transferee;
- The intended use is consistent with protection of human health and the environment;
- The deed will contain restrictions necessary to ensure protection of human health and the environment; and
- All remedial investigations and response actions will be completed by the transferee notwithstanding the transfer of the property.

The Navy and Agency envision that some of the property at HPS Phase II will be allowed to transfer early. Current plans are for an early transfer of title to Parcels B (except for the area referred to as IR 7/18, discussed further below) and G, followed by potential early transfers of other parcels if deemed appropriate and necessary. Under the early transfers as currently envisioned at HPS Phase II, the Navy would complete all radiological cleanup activities and obtain an approved ROD for any given parcel prior to title transfer. Because the Navy has already conducted significant remedial activities, it is expected that the Navy may complete, before transfer, the initial installation of groundwater treatment systems and soil vapor extraction systems and conduct major soil excavations. Responsibility for any remedial work not yet completed at the time of transfer would be transferred from the Navy to the Agency under the terms of an Early Transfer Cooperative Agreement (ETCA). The ETCA would grant Navy funds to the Agency sufficient to complete the Navy's cleanup obligations.

It is anticipated that the Agency would then be responsible for those remedial activities that could be carried out most easily as part of the redevelopment of the property. Those remedial actions could include:

- Removal of limited areas of contaminated soil;
- Completion of previously-commenced groundwater remediation and groundwater monitoring;
- Construction of revetment walls in Parcel B along the shoreline to prevent contaminant migration into the Bay;
- Placement of vapor barriers under buildings where they are found to be necessary; and
- Placement of a final cover over existing soil through the use of new building foundations, roads, sidewalks, parking lots and/or placement of clean fill in open space areas.

Some or all of the Agency's remediation obligations under the ETCA may be assumed by the Project Applicant of the property, subject to a separate agreement. In addition to the ETCA, the Agency and the Project Applicant would be expected to enter into a legally enforceable remediation agreement with USEPA and state regulatory agencies called an Administrative Order on Consent (AOC). This document would commit the Agency and Project Applicant to completing the remedial work that it has agreed to undertake for the Navy. The AOC would be one of the documents supporting the decision by the Governor and USEPA Administrator to allow an early transfer under CERCLA. In turn, USEPA and the State would be expected to modify the terms of the FFA with the Navy to provide that the Navy is not responsible for the scope of work assumed by the Agency and Project Applicant, provided the Agency and Project Applicant continue to fulfill those obligations.

Leasing Property Before Completion of Cleanup at HPS Phase II

CERCLA also allows the Department of Defense to lease contaminated or potentially contaminated properties to third parties. Under this scenario, the Navy would prepare a Finding of Suitability to Lease (FOSL), and USEPA must determine that the property is suitable for lease for the uses contemplated, and that the uses are consistent with protection of human health and the environment and with remedial action that will be taken. The FOSL would document environmental findings for the parcels and the suitability of parcels for a lease. A lease could be a short-term lease (generally less than 10 years) or a long-term lease (e.g., 60 years) which envisions eventual conveyance of the property. This longer-term lease is called a Lease in Furtherance of Conveyance (LIFOC). The FOSL would include a summary of contamination and risk, and require lease notifications and restrictions necessary to protect against threats to human health and the environment to be included in the LIFOC, and include adequate assurances that all necessary remedial action has been taken or will be taken after the execution of the lease.

The Navy may lease some property to the Agency under a LIFOC, such as where it desires to give the Agency access to the property to carry out some specified activities but the property is not yet ready for a transfer under a FOST or FOSET. Activities likely to be conducted under a short-term lease or LIFOC include abatement of asbestos containing materials or lead-based paint and/or building demolition. (Abatement activities not involving building demolition may also be conducted pursuant to a license issued by the Navy). Interim uses of certain buildings or areas by commercial or industrial subtenants might also take place under a short-term lease or LIFOC. The FOSL would be expected to require the terms of the lease to contain certain restrictions on activities and uses, such as a prohibition against soil excavation without approval of a workplan by the Navy and USEPA.

Under the any leasing scenario, responsibility for environmental remediation at leased property would not transfer to the Agency or Project Applicant as is expected at early-transferred property. Instead, the Navy would continue to be responsible for environmental remediation during the terms of the lease, until either the title to the property transfers under FOST after completion of remediation or title transfers under a FOSET before completion of remediation.

Establishing and Enforcing Institutional Controls at Hunters Point Shipyard

The Role of Institutional Controls at Hunters Point Shipyard

Prior to any transfer or lease, early or not, the Navy must ensure that the property is suitable for the use intended and that the intended use is consistent with the protection of human health and the environment. Where hazardous substances remain on the property at the time of transfer at levels that are not suitable for unrestricted uses, such assurance can be achieved through Institutional Controls (ICs), a set of legal and administrative mechanisms to implement land use restrictions to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances present on the property, and to ensure the integrity of remedial action. ICs are required on a property where the cleanup is determined to be complete even though residual levels of hazardous materials remain on the property at levels that would not allow for unlimited use and unrestricted exposure. ICs are expected to be required for HPS Phase II because the Navy and regulatory agencies in exercising their authority have determined that in order to be conservative (e.g., protective) in their evaluation of the property, particularly the areas composed of Bay Fill, they would require ICs for the residual levels of hazardous materials on the property. Implementation of ICs will allow the property to be developed for its intended use, subject to certain rules and regulations designed to prevent exposure to residual levels of hazardous materials. ICs include requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

To implement ICs, the Navy anticipates that it will rely upon ICs in the form of environmental restrictive covenants as provided in the "Memorandum of Agreement between the United States Department of the Navy and the California Department of Toxic Substances Control" (Navy/DTSC MOA). The "Covenant(s) to Restrict Use of Property" will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC against future transferees. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the Navy and by regulatory agencies against all future transferees.[327]

In areas not planned for residential development at HPS Phase II, it is anticipated that the restrictions in the Covenant and Deed will prohibit use of the property as a residence, hospital for humans, schools for persons less than 21 years of age or day care center, unless the FFA Signatories approve a specific proposal for such a use., It is also anticipated that there will be a restriction against excavation or disturbance of soil or groundwater unless either a site-specific workplan is approved by the FFA Signatories, or the activity is consistent with an applicable "Risk Management Plan" (RMP) pre-approved by the FFA Signatories. A

[327] BRAC PMO, *Hunters Point Shipyard Parcel B Proposed Plan Fact Sheet*, June 2008. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

RMP specifies protocols and requirements for excavation, stockpiling, and transport of soil and for disturbance of groundwater as well as a system to respond to the discovery of previously unknown areas of contamination (e.g., an underground storage tank unearthed during normal construction activities). In a few specific areas, it is expected that there will be special restrictions associated with protecting the integrity of waste containment structures (e.g., caps) or ongoing treatment systems and with implementing the operation and maintenance plan for those remedies.

For parcels subject to early transfer, the restrictions may be more stringent until cleanup actions are completed, but restrictions are still expected to be imposed at most or all areas after remediation is complete because the ubiquitous nature of low levels of hazardous materials in Bay Fill makes it infeasible to remediate all of those materials. The specific mechanisms used to implement and enforce the activity restrictions in the Covenant and Deed(s) will be set forth in a Land Use Control Remedial Design document approved by the FFA Signatories.

If the Navy transfers property under a short-term lease or LIFOC, as explained previously, under CERCLA, the terms of the lease or LIFOC would contain restrictions similar, to those described above that would be contained in a Covenant and deed under an early transfer.

Although the Navy may transfer procedural responsibilities for enforcement of land use restrictions to another party by contract, property transfer agreement, or through other means, the Navy will retain ultimate responsibility.

Specific Institutional Controls Already Selected at HPS Phase II

The ICs included as part of the remedy selected in the Parcel B ROD Amendment are expected to form the basis for the ICs included in the RODs for the other parcels, so they are described in detail here. (As an example of this, the ROD for Parcel G imposes very similar ICs as the ROD for Parcel B). Figure III.K-2 indicates the locations in Parcel B that will require ICs—such as land use restrictions—to minimize potential human health and environmental risks after remediation is completed.

Except for the area called IR 7/18 (IR 7/18 site), Parcel B is intended as a mixed-use, residential community. Therefore, the ICs do not include a prohibition against residential use or other "sensitive uses" like schools, hospitals, and day care centers. Growing vegetables or fruits in native soil for human consumption and use of groundwater will be prohibited. In addition, the following general types of activities would be restricted: "land disturbing activity," which includes, but is not limited to, excavation of soil, road construction and infrastructure, demolition or removal of hardscape, any activity that involves movement of soil excavated from below the surface cover, and any other activity that causes or facilitates movement of known contaminated groundwater; alteration, disturbance, or removal of any component of a response or cleanup action; extraction of groundwater and installation of new groundwater wells; and removal or damage to security features. The ROD specifies that such restricted activities are allowed only if they are conducted in accordance with the requirements of a RMP approved by the FFA Signatories. At the time of transfer, it is expected that there will be two Parcel B RMPs specifying the processes to be used to gain approval for, and conduct, such restricted activities at different stages of the development: an RMP for use during Development and a Post-Development RMP.

Specific activity restrictions associated with certain contaminated areas would also be imposed. These may consist of the use of engineering controls or other design methods to ensure that areas that contain VOCs that could produce unacceptable indoor vapor inhalation risks from VOCs present in the subsurface are reduced to levels that are protective of human health. In addition, land use restrictions for property in IR Sites 7/18 would be reviewed and approved by the FFA Signatories in accordance with the covenants and deed restrictions. For IR Sites 7/18, a document such as an Operation and Maintenance Plan will identify any additional soil and radiological management issues, including restrictions on excavation in the radiologically impacted areas, and protection of the soil cap that will be placed at that location. Excavation within the potentially radiologically impacted area will require a separate site- and activity-specific work plan be prepared and submitted to the Navy and other FFA Signatories. Workplan(s) typically include descriptions of any necessary soil sampling and analysis, disposal of excavated soils, and restoration of the integrity of the soil cap after excavation.[328]

III.K.3 Regulatory Framework

Regulations Governing Hazardous Materials Release Sites

Federal Hazardous Materials Release Cleanup Requirements

The Navy is required to implement the investigation and cleanup of hazardous materials contamination in accordance with a complex framework of established federal laws and regulations in accordance with the FFA, with USEPA as the lead agency for hazardous substances remediation. Although federal environmental cleanup laws like CERCLA and RCRA do apply at the non-federal land at Candlestick Point, they are administered by state agencies and are described below.

State Hazardous Materials Release Cleanup Requirements

Navy remedial actions at HPS Phase II (and any remedial actions that may be necessary at Candlestick Point) must also comply with applicable state requirements. At the state level, DTSC administers laws and regulations related to hazardous waste and hazardous substances pursuant to Division 20, Chapters 6.5 and 6.8 of the *California Health and Safety Code* and Title 22 of the *California Code of Regulations* (CCR), which are the state equivalents of RCRA and CERCLA, respectively. The RWQCB enforces laws and regulations governing releases of hazardous substances and petroleum pursuant to pursuant to Division 20, Chapters 6.7, 6.75, and 6.8 of the *California Health and Safety Code* (Sections 25100, 25200 and 25300 et seq.), and the *Porter Cologne Water Quality Control Act* (Division 7, Section 13100 et seq. of the *California Water Code*) and CCR Title 23. In particular, the RWQCB focuses on all petroleum releases and those hazardous substance releases that may impact groundwater or surface water.

In addition, the CDPH is responsible for ensuring facilities that used, stored, or disposed of radiological materials are properly investigated, decontaminated, and decommissioned or licensed (or properly issued an exemption from such requirements) in accordance with state and federal laws and regulations, including

[328] BRAC PMO, *Hunters Point Shipyard Parcel B Proposed Plan Fact Sheet*, June 2008. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

the state Radiation Control Law (*California Health and Safety Code* Section 114960 et seq. and CCR Title 17, Division 1, Chapter 5. The licensing requirements (and, therefore, the process for approving exemptions from such requirements) administered by CDPH do not apply to federal facilities, but do apply when such facilities are transferred out of federal ownership. CDPH has indicated its willingness to consider granting an exemption from the licensing requirements to the City for areas where residual radiological materials may remain in place under a cap, like IR 7/18. The basis for the exemption would be that the requirements of CERCLA, and the ICs imposed pursuant to CERCLA would provide protection equivalent to the requirements of the license.

Local Hazardous Materials Release Cleanup Requirements

San Francisco Health Code Article 22A and its companion Article 21 of the *Public Works Code* (sometimes referred to as the Maher Ordinance) require an investigation of the potential presence of hazardous wastes that may be present in soil within historic fill areas at construction sites as a prerequisite for certain excavation and/or building requirements. As discussed above, Article 22A is intended to protect the health and safety of construction workers, residents, and occupants from risks associated with the potential presence of hazardous wastes in the soil by requiring a site assessment and mitigation of any risks identified as a condition for construction of a planned project. An Article 22A investigation is required if (1) more than 50 cubic yards of soil are to be disturbed, and (2) the project site is bayward of the 1851 high-tide line (i.e., in an area of Bay fill), as designated on an official City map, or (3) the site is at any other location in the City designated for investigation by the Director of the SFDPH. The reports are submitted to the Department of Public Works (DPW) and SFDPH. Article 22A regulations take effect at the time of the building permit application for projects located on filled land requiring excavation.

Under Article 22A, the Project Applicant must provide a site history to the SFDPH, and a professional geologist, civil engineer, or engineering geologist registered or certified by the State of California must conduct soil sampling to determine whether the soil contains hazardous waste using DTSC- or RWQCB-approved methods. A soils sampling and analysis report must be submitted to SFDPH (and DTSC, RWQCB, and other agencies if determined by SFDPH). If the soil sampling and analysis report indicates there are no hazardous wastes present in soil, the Article 22A requirements are assumed by SFDPH to be satisfied. If the soil sampling and analysis report or site history indicates hazardous wastes are, or may be, present in soil, a site-specific mitigation report must be prepared and submitted to SFDPH. The site mitigation report is required to contain the following information: a determination whether the hazardous wastes in soil are causing or are likely to cause significant environmental or health and safety risks, and if so, recommend measures that will mitigate the risks; and that the recommended site mitigation measures have been completed, which may include follow-up soil sampling and analysis.

Construction in those portions of Candlestick Point located bayward of the 1851 high tide line that would involve excavation of greater than 50 cubic yards of soil would be subject to the requirements of Article 22A. Because Article 22A requirements do not apply to Hunters Point Naval Shipyard, the SFDPH created Article 31. Article 31 was added to the *San Francisco Municipal Code* in 2004 (Ordinance 0303-04) in conjunction with the execution of a Disposition and Development Agreement (DDA) between the Agency and Lennar Urban pertaining to redevelopment of Parcel A (HPS Phase I) after the parcel was transferred from the Navy to the Agency in 2004. As explained in Attachment 12 to the DDA, the legislation was modeled on Article 22A. In general, Article 31 regulations establish the following: allowable residual soil

concentrations, and requirements for preparing plans and reports, including Site Evaluation, Supplemental Site Evaluation, Site Mitigation, Risk Evaluation, and Closure Reports. The regulations also establish a mechanism for SFDPH to verify compliance with certain requirements imposed in the previous EIR for development of HPS and establishes minimum criteria for various documents required by that EIR: DCPs, transportation and disposal plans, soil importation plans, health and safety plans, and stormwater and erosion control plans.

As presently drafted, Article 31 applies only to soil disturbances at Parcel A. However, it contains five sections that have no text other than a notation that they are reserved for Parcels B, C, D, E, and F. As discussed in Impacts below, the City anticipates that the requirements of the Land Use Control Remedial Design documents to be prepared as part of the CERCLA process and other aspects of the institutional controls, including the approval of Risk Management Plans, will incorporate many of the requirements for the other HPS parcels that are imposed on Parcel A by Article 31. Nevertheless, the City presently anticipates that, before additional parcels are transferred, it will amend Article 31 to add content to the relevant "Reserved" section(s). That additional content is expected to specify a similar process whereby SFDPH would assist permit-issuing departments of the City to verify that restrictions in deeds and covenants enforceable by the FFA Signatories and the Navy, and other mitigation measures identified by this EIR, have been complied with before the City issues excavation and other ground-disturbing permits and that compliance with the various measures continues for the duration of the construction.

Handling of Affected Groundwater

It may be necessary to pump shallow groundwater or "dewater" areas to facilitate construction. Discharges to the sewage system related to these activities are regulated by the DPW through Article 4.1, the Industrial Waste Ordinance of the *Public Works Code* as well as San Francisco Public Utilities Commission (SFPUC) batch wastewater discharge permit process. Groundwater from dewatering and/or cleanup activities must meet specific treatment standards before being discharged to the City sewage system under permits issued by the SFPUC. Permittees/dischargers typically also monitor the groundwater discharged to the sewer system and report regularly to the SFPUC.

If shallow groundwater were to be pumped directly into the Bay as a necessary by-product of construction dewatering, the discharger would be required to notify and obtain approval of the RWQCB, as described in Section III.M. Any groundwater proposed for discharge from the Project site into the Bay must meet strict water quality standards established by the San Francisco Bay Basin Plan as defined by the RWQCB, and may have to be treated before discharge into the Bay to avoid potential degradation of the Bay's water quality. Furthermore, dischargers are required to meet stringent monitoring standards established by the RWQCB (and to a certain extent, the State Water Resources Control Board) to ensure compliance under this permitting system.

Handling of Hazardous Waste

Hazardous waste may be generated from the Project site during construction and would need to be transported to a facility permitted to accept such waste. Management of specific hazardous wastes is addressed at the federal, state, and local levels. DTSC is authorized by USEPA to enforce the requirements of the federal RCRA. Under the state's Hazardous Waste Control Law, DTSC has adopted extensive regulations governing the generation, transportation, treatment, and disposal of hazardous wastes, which

are more stringent than the requirements of RCRA. The state requirements for hazardous waste management specified in the *California Health and Safety Code*, Chapter 6.5, Article 2,

San Francisco Health Code Article 22 provides for safe handling of hazardous wastes in the City. This article incorporates the state requirements for hazardous waste management specified in the *California Health and Safety Code*, Chapter 6.5, Article 2, and authorizes the SFDPH to implement the requirements of the *Hazardous Waste Control Act* related to hazardous waste generators in San Francisco. As provided by Article 22, the SFDPH has the authority to conduct inspections of any facilities where hazardous wastes are stored, handled, processed, disposed of, or treated to recover resources and must maintain records to document compliance with the *Hazardous Waste Control Act*. Hazardous wastes generated at a facility would be disclosed in the Hazardous Materials Certificate of Registration prepared for the facility. Hazardous wastes generated in areas undergoing remediation, if regulatory thresholds are exceeded, would be subject to Article 22.

Handling of Hazardous Materials

Hazardous materials that could be excavated from construction or activities in the Project site may require off-site transportation for disposal and/or treatment. Transportation and disposal of soil that is classified as hazardous waste would be subject to applicable federal and state regulations. The US Department of Transportation (US DOT) regulates hazardous materials transportation, including contaminated soil, between states, as described in Title 49 of the *Code of Federal Regulations*, and implemented by Title 13 of the CCR. The California Highway Patrol and the California Department of Transportation (Caltrans) are the state agencies with primary responsibility for enforcing federal and state regulations related to transportation within California. These agencies respond to hazardous materials (including contaminated soil) transportation emergencies. Together, these agencies determine container types to be used and grant licenses to hazardous waste haulers for hazardous waste transportation on public roads.

San Francisco Health Code Article 21 provides for safe handling of hazardous materials in the City. In addition to specifying permitting requirements for hazardous materials, Article 21 prohibits unauthorized releases of hazardous materials and specifies requirements for reporting an unauthorized release, inspections after an unauthorized release, addressing abandoned USTs or hazardous materials handling facilities, and closure of hazardous materials handling facilities. If removal of a permitted or previously unidentified abandoned or no longer used UST is required, tank closure would be required in accordance with Article 21.

Worker Safety

Occupational safety standards have been established in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. California Department of Occupational Safety and Health Administration (Cal/OSHA) and the federal Occupational Safety and Health Administration (OSHA) are the agencies with primary responsibility for assuring worker safety in the workplace. Cal/OSHA has primary responsibility for developing and enforcing standards for safe workplaces and work practices in California in accordance with regulations specified in CCR Title 8. For example, under Title 8 CCR 5194 (Hazard Communication Standard), construction workers must be informed about hazardous substances that may be encountered. Compliance with Injury Illness Prevention Program requirements (Title 8 CCR 3203) would ensure that workers are properly trained to recognize workplace hazards and to take appropriate steps to reduce potential risks due to such hazards. This would be particularly important if previously unidentified contamination or buried hazards are encountered. If

additional investigation or remediation is determined to be necessary, compliance with Cal/OSHA standards for hazardous waste operations (Title 8 CCR 5192) would be required for those individuals involved in the investigation or cleanup work. A Site Health and Safety Plan must be prepared prior to commencing any work at a contaminated site or involving disturbance of building materials containing hazardous substances, to protect workers from exposure to potential hazards. Specific regulations related to these conditions are discussed below.

Building Demolition and Renovation

Many existing structures and buildings in the Candlestick Point and HPS Phase II are proposed for demolition. Hazardous wastes may be generated in the form of asbestos from friable building materials, lead-based paint on building surfaces, and lighting fixtures. In addition, previously unknown contamination, possibly the result of improper disposal or housekeeping activities, may be discovered as structures are demolished. Such hazardous wastes and materials would be subject to regulations governing hazardous waste and materials outlined above.

Asbestos in Structures and Buildings

Asbestos is regulated both as a hazardous air pollutant under the federal *Clean Air Act* regulations and as a potential worker safety hazard under the authority of Cal/OSHA. These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos- containing building materials; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos-containing building materials. The agencies with primary responsibility for asbestos safety are the Bay Area Air Quality Management District (BAAQMD), Cal/OSHA and OSHA, and USEPA.

Lead-Based Paint

Federal, state, and local laws and regulations govern handling of building materials that contain lead-based paint. OSHA Lead Construction Standards establish a maximum safe exposure level for the following types of construction work where lead exposure may occur: demolition or salvage of structures where lead or materials containing lead are present; removal or encapsulation of materials containing lead; and, new construction, alteration, repair or renovation of structures or materials containing lead. Typically, building materials with lead-based paint attached are not considered hazardous waste (Chapter II, Division 4.5, Title 22, CCR) unless the paint is chemically or physically removed from the building debris.

San Francisco Health Code, Chapter 34, Section 3407, establishes requirements for projects that disturb lead-based paint on the exterior of buildings or steel structures. It is implemented by the Department of Building Inspection (DBI). The ordinance contains performance standards, including a requirement to establish containment barriers that are at least as effective at protecting human health and the environment as those in the most recent *Guidelines for Evaluation and Control of Lead-Based Paint Hazards* promulgated by the US Department of Housing and Urban Development.

In addition, once a structure containing lead-based paint has been properly demolished there are federal and state requirements for future unrestricted residential reuse areas to verify that areas around a former structure were not contaminated with lead prior to or during the demolition process. For Parcel A at HPS, *San Francisco Health Code* Article 31 required submittal of a Lead Based Paint in Soil Sampling Report to analyze and, if found above action levels, remediate lead-based paint in soil. It is anticipated that Article 31 will be amended to require lead-based paint in soil to be addressed at HPS Phase II.

Lighting Wastes and PCBs

Lighting wastes may be classified as a hazardous waste if they contain concentrations of mercury, lead, or PCBs as a hazardous waste when the concentrations exceed specified limits in liquid or nonliquid substances. Fluorescent light ballasts that contain PCBs, regardless of size or quantity, are regulated as hazardous waste and must be transported and disposed of as hazardous waste. Such hazardous wastes and materials would be subject to regulations governing hazardous waste and materials outlined above.

Disturbance or Disposal of Shoreline Sediment

In San Francisco Bay Area, projects involving the disturbance or disposal of sediments (e.g., routine maintenance of a marina) in the Bay cannot be approved without concurrence from all permitting and commenting agencies in the Dredged Material Management Office (DMMO). The DMMO is a joint program of Bay Conservation and Development Commission (BCDC), RWQCB, State Lands Commission, the US Army Corps of Engineers San Francisco District (USACE), and the USEPA. Also participating are the California Department of Fish and Game (CDFG), the National Marine Fisheries Service, and the US Fish and Wildlife Service, who provide advice and expertise to the process. The purpose of the DMMO is to cooperatively review sediment quality sampling plans, analyze the results of sediment quality sampling, and make suitability determinations for material proposed for disposal in the Bay. The goal of this interagency group is to increase efficiency and coordination between the member agencies and to foster a comprehensive and consolidated approach to handling dredged material management issues. Through the DMMO, Project Applicants fill out one application form that the member agencies then jointly review at bi-weekly meetings before issuing their respective authorizations.[329]

The Dredge Material Reuse/Disposal Application serves as and is accepted for a number of permits, including *(a)* Section 404 or Section 10 dredging authorization by USACE, *(b)* an administrative dredging permit for BCDC, *(c)* the RWQCB water quality certification or waste discharge requirement, and *(d)* a dredging project lease from the State Lands Commission.

The roles, responsibilities, and jurisdictions of the DMMO agencies differ, depending primarily on the proposed dredged material disposal or reuse site. As a result, member agencies may play only an advisory role in certain aspects of the permitting process. Decisions made by the DMMO do not in any way supersede the primary roles of the permitting agencies, which remain free to accept or reject recommendations, including those of the DMMO staff. In practice, however, the discussions at the DMMO meetings help inform the permitting agencies of specific concerns and issues of the member agencies, often before finalization of project documents. The DMMO facilitates the processing of dredging

[329] SFBCDC, Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay, Memo, April 18, 2008.

permit applications within existing laws, regulations, and policies. It was specifically designed to provide a mechanism for consistent review of permit applications through coordinated efforts by DMMO member agencies. It also provides a mechanism to allow the involvement and participation of permit applicants and interested parties during the application process. All applicable regulatory authority and processes of the member agencies remain in full force and effect.[330]

Air Emissions Associated with Development of Hazardous Materials Release Sites

The BAAQMD is primarily responsible for planning, implementing, and enforcing federal and state ambient air quality standards in the San Francisco Bay Area. BAAQMD regulates both criteria air pollutants and toxic air contaminants (refer to Section III.H.3 [Regulatory Framework] [in Air Quality]). The state Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations is also regulated by the BAAQMD. BAAQMD regulates particulate matter from construction activities and requires the implementation of various dust control measures to keep small-diameter particulates, or $PM_{10,}$ levels to a minimum.

In addition, the City has adopted Article 22B, Construction Dust Control Ordinance (Dust Ordinance) that requires stringent controls to minimize dust emissions. The Dust Ordinance was adopted in July 2008 and requires that all site preparation work, demolition, or other construction activities within the City to comply with specific dust control measures. For projects over one half-acre, the Dust Control Ordinance requires that the Project Applicant submit a Dust Control Plan (DCP) for approval by the SFDPH prior to issuance of a building permit by DBI.

The Dust Control Ordinance requires Project Applicants and responsible contractors for construction activities to control construction dust on the site or implement other practices that result in equivalent dust control that are acceptable to the Director. Dust suppression activities may include watering all active construction areas sufficiently to prevent dust from becoming airborne; increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. In addition, *San Francisco Health Code* Article 31 required submittal of a DCP for the Parcel A development. It is anticipated that Article 31 will be amended to include a requirement for submittal of a DCP for HPS Phase II (refer to Section III.H.3 [in Air Quality] for additional information).

Naturally Occurring Asbestos

The California Air Resources Board ATCM for Construction, Grading, Quarrying, and Surface Mining Operations is intended to protect public health and the environment by requiring the use of best available dust control measures to prevent off-site migration of naturally occurring asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and

[330] Dredge Material Management Office, DMMO Annual Report January 1st through December 31st 2003, April 2004. http://www.spn.usace.army.mil/conops/2003AnnualReport.pdf (accessed December 4, 2008).

surface mining operations in areas of ultramafic rock,[331] serpentine,[332] or asbestos.[333] The ATCM applies to grading or excavation activities, which would involve the excavation of bedrock or fill materials potentially containing naturally occurring asbestos.

For construction activities disturbing less than one acre of area underlain by these types of bedrock potentially containing naturally occurring asbestos, specific dust control measures must be implemented in accordance with the ATCM before construction begins and each measure must be maintained throughout the duration of the portion of the construction project when these types of bedrock are being disturbed. For construction activities disturbing greater than one acre of area underlain by these types of bedrock potentially containing naturally occurring asbestos, construction contractors are required to prepare an Asbestos Dust Mitigation Plan (ADMP) specifying measures that will be taken in an attempt to ensure that no visible dust crosses the property boundary during construction. The ADMP must be submitted to and approved by the BAAQMD prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust control measures throughout the construction project. In addition, the BAAQMD may require air monitoring to monitor for off-site migration of asbestos dust during construction activities and may change the plan on the basis of the air monitoring results.

Section III.H describes construction dust, toxic air contaminants, and airborne asbestos regulations further.

Hazardous Materials Use During Occupancy of the Project

The management of hazardous materials is regulated under a number of laws at federal, state, and local levels through programs administered by the USEPA, agencies within the California Environmental Protection Agency (Cal/EPA) such as the DTSC and the RWQCB, US DOT, California Highway Patrol, federal and state Occupational Safety and Health agencies (OSHA), and the San Francisco Department of Public Health (SFDPH).

Many of the state laws and regulations previously described for the cleanup of hazardous materials release sites, which implement federal laws, would equally apply to the routine use of hazardous materials and the generation of hazardous waste at the Project and are not repeated here. These include the state's Hazardous Waste Control Law administered by DTSC, Cal/OSHA workplace regulations, and federal and state DOT transportation requirements. There are additional state and local laws and regulations that would apply to hazardous materials during Project operation, as described below.

Hazardous materials are required to be stored in designated areas designed to prevent accidental release to the environment. *California Building Code* (CBC) requirements prescribe safe accommodations for materials that present a moderate explosion hazard, high fire or physical hazard, or health hazards.

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[331] Ultramafic rocks are formed in high temperature environments well below the surface of the earth.

[332] Serpentine is a naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals. This rock type is commonly associated with ultramafic rock along faults such as the Hayward Fault. Small amounts of chrysotile asbestos, a fibrous form of serpentine minerals, can be common in serpentinite.

[333] Asbestos is a term used for several types of naturally occurring fibrous minerals found in many parts of California.

The *Hazardous Materials Management Act* requires that businesses handling or storing certain amounts of hazardous materials prepare a Hazardous Materials Business Plan (HMBP), which includes an inventory of hazardous materials stored on site (above specified quantities), an emergency response plan, and an employee-training program. Businesses that use, store, or handle 55 gallons of liquid, 500 pounds of a solid, or 200 cubic feet of a compressed gas at standard temperature and pressure require this business plan (i.e., the stadium, and/or marina).

During Project operation, for activities subject to such requirements, these laws and regulations would be monitored and enforced by the City in accordance with specific articles established in the *San Francisco Health Code*, as summarized below.

San Francisco Health Code Article 21

Article 21 of the *San Francisco Health Code* provides for safe handling of hazardous materials in the City. In accordance with this article, any person or business that handles, sells, stores, or otherwise uses hazardous materials in quantities exceeding specified threshold amounts would be required to obtain and keep a current hazardous materials certificate of registration and to implement an HMBP submitted with the registration application. Facilities with USTs are also required to obtain a permit to operate the tank. In addition to specifying permitting requirements for hazardous materials and USTs, Article 21 prohibits unauthorized releases of hazardous materials and specifies requirements for reporting an unauthorized release, inspections after an unauthorized release, addressing abandoned USTs or hazardous materials handling facilities, and closure of hazardous materials handling facilities.

This Article helps protect the health and safety of the general community and emergency response personnel, such as fire fighters and paramedics. Data on hazardous materials use are stored in a citywide computer system and can be made available to emergency responders. The information assists emergency responders to assess and resolve hazardous materials incidents quickly and safely. Inspections are performed by the City every one to two years or upon complaint.

Article 21 incorporates the California Underground Storage Tank Regulations specified in the *California Health and Safety Code*, Chapters 6.7 and 6.75; Hazardous Materials Release Response Plans and Inventory Regulations requiring preparation of an HMBP, and specified in the *California Health and Safety Code*, Chapter 6.95, Article 1; Aboveground Petroleum Storage Tank Regulations requiring preparation of a SPCC plan, and specified in the *California Health and Safety Code*, Section 25270.5; and hazardous materials management provisions of the *Uniform Fire Code* requiring Hazardous Materials Inventories specified in Sections 8001.3.2(a) and 8001.3.3(a). It also provides for additional stricter local requirements.

San Francisco Health Code Article 22

San Francisco Health Code Article 22 provides for safe handling of hazardous wastes in the City. This article incorporates the state requirements for hazardous waste management specified in the *California Health and Safety Code*, Chapter 6.5, Article 2, and authorizes the SFDPH to implement the requirements of the *Hazardous Waste Control Act* related to hazardous waste generators in San Francisco. Hazardous wastes generated at a facility would be disclosed in the Hazardous Materials Certificate of Registration and HMBP prepared for the facility in accordance with Article 21 of the *San Francisco Health Code* (described above).

San Francisco Department of Public Health Hazardous Materials Unified Program Agency

Cal/EPA has adopted regulations implementing a "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program" (Unified Program). The six program elements of the Unified Program are hazardous waste generators and hazardous waste on-site treatment, underground storage tanks, above-ground storage tanks, hazardous material release response plans and inventories, risk management and prevention program, and Uniform Fire Code hazardous substances management plans and inventories. The program is implemented at the local level by a local agency—the Certified Unified Program Agency (CUPA). The CUPA is responsible for consolidating the administration of the six program elements within its jurisdiction.

The San Francisco Department of Public Health Hazardous Materials Unified Program Agency (HMUPA) has been granted authority by the State under the Unified Program to enforce the program element regulations pertaining to hazardous materials in the City. These include permitting for hazardous materials storage, underground storage tanks, and hazardous waste generation under the DPH Certificate of Registration Program, described below.

A Hazardous Materials Compliance Certificate is awarded to businesses registered with the SFDPH that provide required annual information as applicable to their facility including: hazardous materials and wastes inventories, use, materials reduction, on-site treatment, and employee training; facility maps; emergency response procedures; underground storage tanks management (including forms, leak detection monitoring program, and financial responsibility certificates); medical wastes; regulated substances; aboveground storage tanks; diesel backup generators; and chlorofluorocarbon recovery and recycling. Under the DPH HMUPA, building contractors temporarily storing hazardous materials at a construction site must also apply and receive a HMUPA certificate for storage of hazardous materials during construction and must provide the appropriate fees.

Other Applicable State Regulations

Transportation of Hazardous Materials

CCR Section 31303 requires that when hazardous materials are transported on state or interstate highways, the highway(s) that offer the shortest overall transit time possible shall be used, and as required by federal and state laws, all other hazardous materials transportation regulations must be followed, such as US DOT regulations for packaging and handling hazardous materials to prevent accidental spills of hazardous materials during transit.

Radioactive Materials

Medical and dental offices use X-ray equipment, and practitioners may use small quantities of radioactive materials such as diagnostics and radiopharmaceuticals. The types and quantities of radioactive materials would be minimal. The CDPH is responsible for ensuring facilities that use, store, or dispose of radiological materials are properly licensed (or properly issued an exemption from such requirements) in accordance with state and federal laws and regulations, including the state Radiation Control Law (*California Health and Safety Code* Section 114960 et seq. and CCR Title 17, Division 1, Chapter 5. The Radiologic Health Branch

(RHB) licenses institutions that use radioactive materials and radiation-producing equipment, such as X-ray equipment. To maintain a radioactive materials license, an institution must meet training and radiation safety requirements and be subject to routine inspections.

San Francisco General Plan

The *San Francisco General Plan* (1996) provides long-term guidance and policies for maintaining and improving the quality of life and the man-made and natural resources of the community. The Community Safety chapter and the Environmental chapter of the *San Francisco General Plan* contain the following policies relating to hazardous materials:

Community Safety

Policy 2.12 Enforce state and local codes that regulate the use, storage and transportation of hazardous materials in order to prevent, contain and effectively respond to accidental releases.

Environmental Protection

Policy 1.4 Assure that all new development meets strict environmental quality standards and recognizes human needs.

San Francisco Bay Plan

Refer to Section III.B for a description of the Bay Plan. The objectives and policies of the Bay Plan concerning hazards that are relevant to the Project are listed below:

Part IV: Development of the Bay and Shoreline: Safety of Fills

2. Even if the Bay Plan indicates that a fill may be permissible, no fill or building should be constructed if hazards cannot be overcome adequately for the intended use in accordance with the criteria prescribed by the Engineering Criteria Review Board.

III.K.4 Impacts

On-site workers and other persons visiting or occupying a site are potentially at risk at sites where hazardous materials have been used or where there could be an exposure to such materials as the result of the presence of unidentified fill materials or historic uses of a site, such as at locations in the Project site. Ecological communities, such as avian and terrestrial habitats and the aquatic environment, may also be at risk, depending on the type of populations and locations relative to potential exposure sources. This section addresses the potential impacts on construction workers, the public, and the ecological environment from exposure to hazardous materials at Candlestick Point and HPS Phase II, including shoreline/intertidal improvements such as rock wall buttresses and riprap-protected slopes that could disturb sediments. Section III.N (Biological Resources) and Section III.M (Hydrology and Water Quality) provide more detailed analysis about construction of Project features that could affect offshore water quality. Potential impacts associated with construction of infrastructure off site are also evaluated.

This section also describes the nature and extent of routine hazardous materials use in existing land uses in the Project site (e.g., PDR [production, distribution, and repair] uses and mixed-use development), and the potential for upset and accident conditions in which hazardous materials could inadvertently be

released. The impact analysis identifies how proposed new land uses would introduce additional operational components (e.g., R&D) that would increase the types and amounts of hazardous materials routinely used, stored, or transported to, from, and within the Project site, and the extent to which existing and future populations could be exposed to hazardous materials.

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to hazards and hazardous materials, but generally consider that implementation of the Project would have significant impacts if it were to:

- K.a Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- K.b Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- K.c Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school
- K.d Be located on a site that is included on a list of hazardous materials sites compiled pursuant to *Government Code* Section 65962.5 and, as a result, create a significant hazard to the public or the environment
- K.e For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area
- K.f For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area
- K.g Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan
- K.h Expose people or structures to a significant risk of loss, injury, or death involving fires

Analytic Method

Scope of Impact Analysis for Hazardous Materials Release Sites

The presence of hazardous materials is related to both the industrial and commercial history of many locations within the Project site as well as the development of the current shoreline through the placement of fill materials. The existing conditions, as described in the Setting (including the status of remediation plans under regulatory agency oversight), provide the baseline against which to compare the effects of the Project. The following impact analyses focus on the potential human health effects associated with hazardous materials that could be encountered during construction, during development (e.g., some land uses would be occupied while new locations are being developed and/or remediated), and at full build-out of the Project.

The analysis also evaluates potential health effects due to materials such as asbestos, lead, or PCBs that could be present in buildings that would be demolished or renovated, or in soil or rock that would be excavated or graded. The potential for previously unidentified contamination to be encountered and possible adverse effects, if any, are qualitatively analyzed as well.

The analysis presented in this section is based on conditions as they existed in 2007 through 2009, based on published reports and agency databases available in 2009. As noted in the Introduction, remediation of hazardous materials releases identified in HPS Phase II is taking place through a regulatory process that the Navy is required to implement under CERCLA irrespective of whether or not HPS Phase II part of the Project is implemented.

Risk Estimates and Cleanup Levels

Various regulatory agencies, such as the USEPA, RWQCB, DTSC, and OSHA and Cal/OSHA are responsible for developing and/or enforcing risk-based standards to protect the public and the environment. The current regulatory view of redevelopment where chemical and radiological constituents are present in the soil or groundwater is that the decisions regarding cleanup and future site use should be based on actual and reasonably projected risks presented by individual sites. This risk-based approach is marked by a focus on planned land uses, a recognition that all sites do not present the same risk, the understanding that the actual risks posed by a site are a function of the populations that could be present and the activities they could be engaged in, and an acknowledgment that many risks can be reduced and/or eliminated through the implementation of controls placed on the future use of the land, including through legally enforceable restrictions on use and risk management plans.

Depending on the types of chemicals present and potential pathways through which individuals might be exposed to the chemicals, contaminants in soil or groundwater can often be left in place or cleaned up to a degree that does not pose a threat to human health or the environment. The risk estimates take into consideration such factors as the concentration and further potential migration of contaminants, potential hazards to remediation workers and nearby populations, and potential exposures to the public, based on future land use. The risk-based decision-making relies on the preparation of risk-based evaluations to quantify potential exposures and resultant potential adverse health effects. For instance, in an area of known soil contamination where a park is to be constructed, once the park is in place it would provide a barrier to prevent direct access to the contamination. The assessment of whether soil and groundwater is contaminated and requires remediation is guided by using established risk assessment procedures and comparing concentrations of potential contaminants (chemical or radiological), obtained through site sampling, to regulatory standards or to site-specific standards. Numerical risk values are estimated for cancer-causing compounds and for non-cancer-causing compounds. At HPS Phase II, where there is identified contamination requiring the preparation of a risk assessment, the risk assessment calculations for soil and groundwater were based on exposure rates recommended by USEPA and DTSC. As part of the CERCLA remedial process for HPS, the Navy, in consultation with the FFA Signatories, adopted a conservative and protective approach that estimates the highest health risks that are reasonably expected at HPS. The human health risk assessments assumed a one-in-a-million (1×10^{-6}) excess cancer risk[334] threshold for developing suitable and protective remedial action alternatives. Unlike cancer risk estimates, the measure used to describe the potential for noncarcinogenic toxic effects to occur is expressed in terms of a Hazard Index (HI). The HI assumes that there is a level of exposure below which it is unlikely, even for sensitive populations, to

[334] Carcinogenic compounds are present in daily life and present a risk of exposure to individuals; there is a cumulative risk from numerous environmental sources. The risk criterion (1x10-6) and the quantified values that are compared to the criterion represent the *probability* of occurrence that exposure to carcinogenic materials would exceed—in others words, would be in addition to—existing risk.

experience adverse health effects. Adverse health effects are not anticipated when chronic and acute hazard indices are less than one. The final calculated risk values represent a conservative probability of occurrence.

The contaminants in HPS Phase II, and risk assessments that were used in developing cleanup levels, are an existing condition. As described in the Setting, the cleanup levels and remedial plans have been or will be approved by the FFA Signatories (and by the Governor for the case of an early transfer) at HPS Phase II. Remediation to achieve those levels will occur regardless of whether the Project is implemented. The cleanup will follow actions and timelines that have been, or will be, coordinated between the Navy and FFA Signatories for HPS Phase II. However, this analysis does evaluate the potential impacts of the limited remedial activities that may be conducted by the Agency or Project Applicant in conjunction with development activities, as described below.

Figure III.K-5 (Hunters Point Shipyard Phase II Navy Parcel Overlay) illustrates the relationship of the Project districts to the existing Navy cleanup parcel designations.

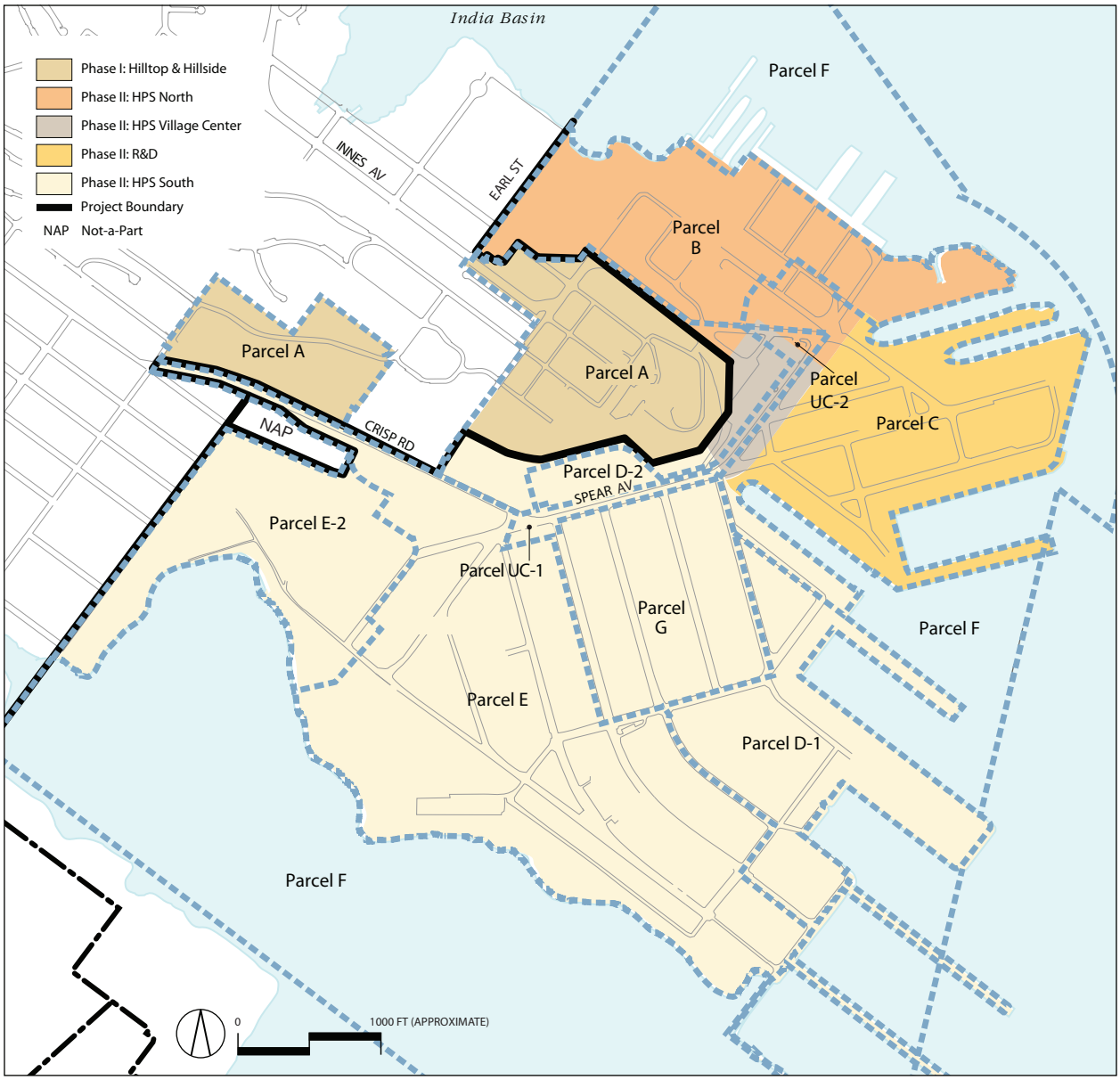
Management of Hazardous Materials Contamination Risks During Development

The analysis in this EIR focuses on whether the physical development of the Project could expose construction and maintenance workers, visitors, or occupants, or ecologic systems, to potential hazards associated with identified contaminants throughout the life of the Project.

Further, for HPS Phase II, the analysis reflects the requirements of the RODs approved to date and the stated intentions of the Navy, USEPA, DTSC (and through DTSC, CDPH) and the RWQCB to require through the CERCLA process that before any Project development activity occur at HPS Phase II, appropriate and legally enforceable environmental restrictions on uses and activities at the Project site (as described above) will be in place and applicable to that activity, whether in the form of a recorded covenant, deed provision, or lease term. Such restrictions will have been approved by the FFA Signatories as being sufficient under CERCLA and other applicable laws to ensure protection of human health and the environment during and after the development activity process, and the FFA Signatories will have approved a Land Use Control Remedial Design Document, or similar documents, identifying the specific mechanisms to be used to implement and enforce the restrictions. Although these restrictions and enforcement mechanisms will be established independent of this EIR, the mitigation measures identified in this EIR will provide redundant protection by requiring all Project development activities as well as all activities and uses conducted after the completion of development, to be in compliance with these environmental restrictions.

Such restrictions are expected to be applicable both to development activities that take place before remediation is complete (e.g., if the property is subject to an early transfer), and to development activities that take place after remediation is complete (e.g., if the property is transferred after a FOST, or if the property is leased and limited development activities like asbestos and lead-based paint abatement or building demolition are permitted under the terms of the lease). Although use and activity restrictions may be more stringent before remediation is complete, it is expected that restrictions will still be necessary after remediation is complete in most or all areas of HPS Phase II.

- Figure III.K-6 (Status of CERCLA Process) provides a map of the various Navy parcels at HPS Phase II and illustrates the steps in the CERCLA process and the current status of the parcels in that process.



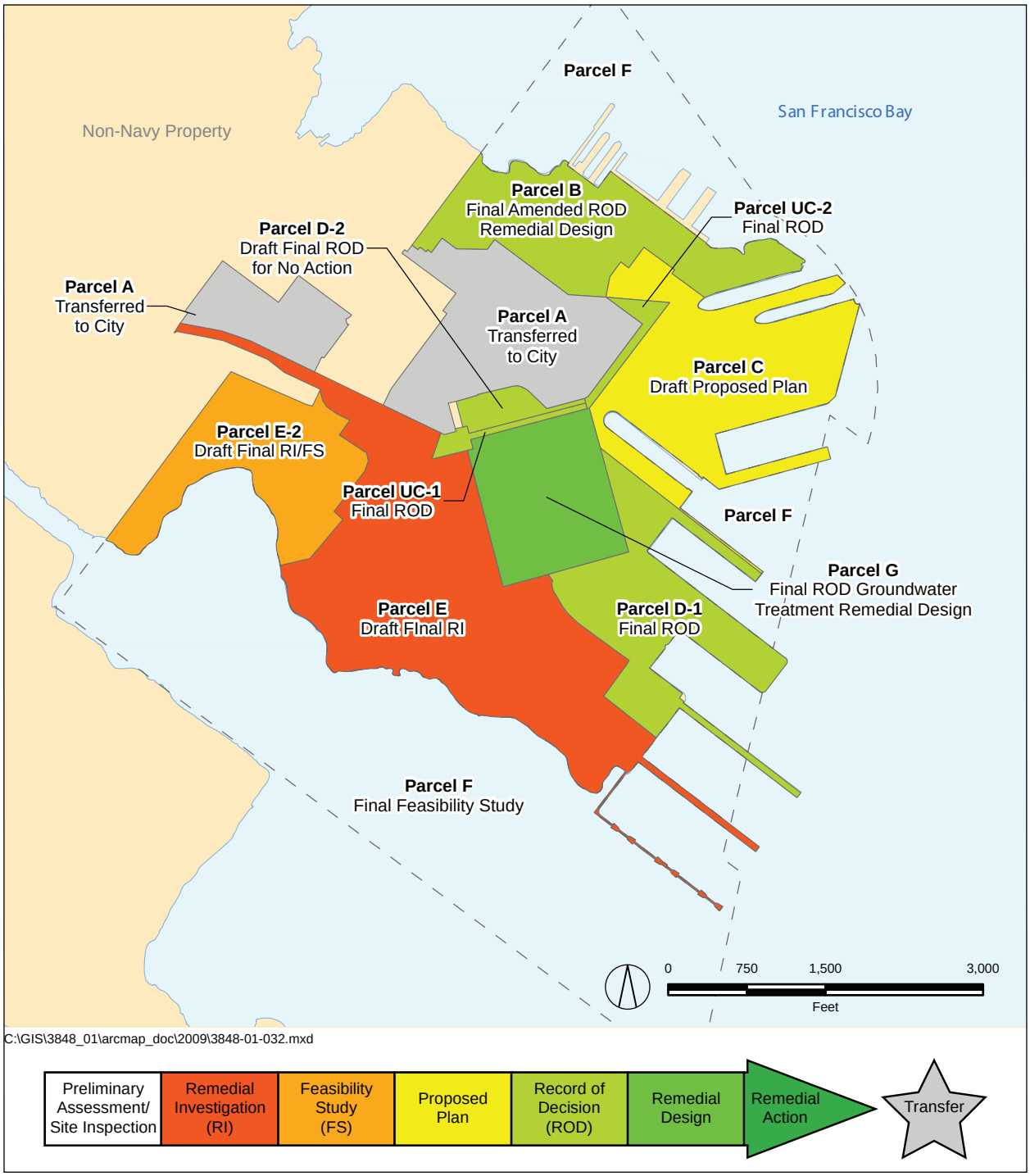
SOURCE: Lennar Urban, 2009.

PBS&J 04.21.10 02056 | JCS | 10

Candlestick Point — Hunters Point Shipyard Phase II EIR

HUNTERS POINT SHIPYARD PHASE II NAVY PARCEL OVERLAY

FIGURE III.K-5



SOURCE:PBS&J, 2010.

PBS&J 04.09.10 02056 | JCS | 10

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.K-6

STATUS OF CERCLA PROCESS

Development Schedule

Development is proposed to occur over a period of 20 or more years; it is likely development and occupancy of some portions of the Project would occur at the same time as demolition and construction would occur in other portions of the Project site in which contaminated soils or groundwater have been identified. Relatively few individuals would be exposed to the potential contaminated material during the initial construction. During later periods of construction, existing uses may remain, some interim uses may be occupied, and some of the proposed commercial, retail, open space, and residential uses would be completed and occupied. Consequently, an increasingly greater number of people could be affected by construction activities involving the disturbance of contaminated soil or groundwater during later development. This could be a particular issue in the residential portions of HPS Phase II, where construction in contaminated soils may occur near occupied residential units.

Existing uses adjacent to the Project site (e.g., in HPS Phase I) and new interim uses in the Project site during development present issues similar to those of development that occurs over a period of years. The issues would be whether there would be potentially significant impacts to people occupying sites in the Project (1) while remediation of nearby hazardous material sites has not been completed, and (2) while development that would disturb soils and/or shallow groundwater was occurring at adjacent or nearby sites in the Project. Those impacts would be of greater concern than impacts following build-out, because exposure to chemicals in soil and/or groundwater would be more likely to occur during, rather than after, development. Thus, the analysis of potential human health and ecological effects that could occur during construction applies to existing, remaining, interim uses, and to permanent uses occupied in early or middle periods of development.

Impacts from adjacent and nearby hazardous material release sites are carefully analyzed in the transfer documents (e.g., FOSTs, FOSETs, and FOSLs) prepared to comply with the requirements of CERCLA. For example, the FOST for Parcel A described in detail the potential impact on future residents of Parcel A from the hazardous material release sites where remediation had not been completed on other adjacent parcels, particularly what is now Parcel E-2, and concluded that there would not be significant impacts on Parcel A from Parcel E-2 or other adjacent parcels at HPS Phase II.

Scope of Impact Analysis for Hazardous Materials Use During Occupancy

The analysis assumes nearly all Project uses would involve the routine use of hazardous materials at varying levels, including uses at existing PDR and mixed-use land uses, and that there is the potential that such use could result in a release of hazardous materials. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this stage of Project development. Therefore, the analysis qualitatively evaluates broad categories of hazardous materials use, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios and households. For purposes of the analysis, compliance with existing federal, state, and local laws and regulations pertaining to hazardous materials management are presumed to be sufficient to minimize health and safety risks, and that state and local agencies would be expected to continue to enforce applicable requirements to the extent they do so now.

Existing Regulatory Framework

The following impact analyses also relies on compliance with applicable site development regulations including, but not limited to, the requirements imposed in deeds, leases or recorded land use covenants, RMPs, and the requirements of the federal, state, and local laws and regulations that have been summarized in Section III.K.3.

Construction Impacts

Impact HZ-1: Exposure to Known Contaminants

Impact of Candlestick Point

Impact HZ-1a **Construction at Candlestick Point bayward of the historic high tide line would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with known contaminants from historic uses. (Less than Significant with Mitigation)** ***[Criterion K.b]***

Types of Construction and Development Activity Anticipated at Candlestick Point

Implementation of Candlestick Point would involve extensive construction to accommodate new development within that area, as shown in Figure II-4 (Proposed Land Use Plan) and in Table II-2 (Existing and Proposed Uses) in Chapter II. Site preparation would include deep excavations for large structures such as residential towers, with plans to use the cut material elsewhere within the Project site as fill; installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. Additionally, there would be roadway improvements, including rebuilding Harney Way and other new roadways within the site. As stated in the Setting, the current site of Candlestick Park and associated parking, CPSRA, an area north of Yosemite Slough (North Park Area), an area southeast of Harney Way (Last Port Area), and Hunters Point Expressway (ring road) comprising approximately 235 acres was investigated in 1998.

Portions of Candlestick Point with a Potential for Exposure

As described in the Setting section above, there are no sites with known contamination requiring remediation at Candlestick Point. At Candlestick Point, results of soil and groundwater sampling taken at depths of up to 15 feet detected organic compounds and metals at various depths and locations, indicating the chemicals were associated with fill materials. A human health risk evaluation concluded that the presence of the detected chemicals in soil and groundwater did not pose an unacceptable carcinogenic or non-carcinogenic risk to future workers or visitors, nearby residents or workers, or recreational uses in the Bay. The report concluded no further action was necessary. The report did note that if excavation to depths greater than 15 feet were planned, additional sampling, risk evaluation, or methane monitoring, may be appropriate. A Phase I ESA conducted in 2006 and updated in 2009 concluded that releases or areas of recognized environmental conditions were not observed during either of these Phase I assessments. DPR staff have also indicated that, decades ago, individuals may have disposed of household hazardous waste on portions of the CPSRA, although DPR does not have any files indicating that a state-regulated landfill was on-site. The ESAs do recommend that a soil management plan be developed prior to redevelopment

to describe procedures to follow in the event unexpected contamination is encountered during construction activities and if appropriate, comply with Article 22A.

Although there are no known releases of hazardous materials requiring remediation in the portions of Candlestick Point bayward of the 1851 high-tide line, the detection of low-levels of hazardous materials in 1998 and general knowledge of the types of material that can be in Bay fill lead to the conclusion that there is a potential for exposure to hazardous materials from development activity in these areas.

Since the potential source of hazardous materials that could require remediation at Candlestick Point is fill material, and the portions of Candlestick Point located landward of the 1851 high tide line are not composed of fill material, and the ESAs for these portions did not identify any other sources, there is no significant potential for exposure to hazardous materials from development activities at these areas. The discussion of Candlestick Point in the rest of this section, therefore, applies only to the portions of Candlestick Point located bayward of the 1851 high tide line.

Application of the Article 22A Site Evaluation and Mitigation Process to Potential Construction Impacts at Candlestick Point

The requirement for a site assessment prior to obtaining a grading permit for new construction would be triggered by Article 22A for sites at Candlestick Point located bayward of the 1851 high tide line, which are the Candlestick Point North and Candlestick Point South districts, comprising the bulk of the area previously investigated in 1998. Compliance with Article 22A requirements would ensure current conditions are assessed in the area previously investigated in 1998, and that they are assessed in light of the specific planned depths of excavation. As stated below on page III.K-68, Hunters Point Shipyard soil shall not be used for grading adjustments within CPSRA, but may be reused on the Shipyard to the extent permissible under the Navy remedial program.

Article 22A requires further investigation and site mitigation if a release of hazardous materials is indicated by the environmental assessment. The Article 22A soil analysis report would be submitted to the SFDPH. If concentrations of chemicals are found above certain criteria via the Article 22A soil sampling process, a site mitigation plan is required to be submitted to and approved by the SFDPH and would also include the planned disposal method for any wastes generated. The site mitigation plan would specify the actions that must be implemented to mitigate the risks posed by the identified release of hazardous materials. Site mitigation plans are described in more detail in the discussion of mitigation measure MM HZ-1a below.

To reduce impacts related to exposure to known contaminants at Candlestick Point from construction activities, the following mitigation measure shall be implemented.

MM HZ-1a *Article 22A Site Mitigation Plans. (Applies only to Candlestick Point.) Prior to obtaining a site, building or other permit from the City for development activities involving subsurface disturbance at portions of Candlestick Point bayward of the high tide line, the Project Applicant shall comply with the requirements of San Francisco Health Code Article 22A. If the site investigation required by Article 22A (or, in the case of development activity in CPSRA, which is not subject to Article 22A, a comparable site investigation that is carried out to comply with this measure, and which involves notification to California State Parks if a site mitigation plan is prepared), indicates the presence of a hazardous materials release, a site mitigation plan must be prepared. The site mitigation plan must specify the actions that will be implemented to mitigate the significant environmental or health and safety*

risks caused or likely to be caused by the presence of the identified release of hazardous materials. The site mitigation plan shall identify, as appropriate, such measures as excavation, containment, or treatment of the hazardous materials, monitoring and follow-up testing, and procedures for safe handling and transportation of the excavated materials, or for protecting the integrity of the cover or for addressing emissions from remedial activities, consistent with the requirements set forth in Article 22A.

- *To the extent that Article 22A does not apply to state-owned land at CPSRA, prior to undertaking subsurface disturbance activities at CPSRA, the Agency and the California Department of Parks and Recreation shall enter into an agreement to follow procedures equivalent to those set forth in Article 22A for construction and development activities conducted at Candlestick Point State Recreation Area.*

Implementation of mitigation measure MM HZ-1a would reduce effects related to exposure of known contaminants at Candlestick Point, including construction activities at CPSRA, by requiring compliance with Article 22A or an equivalent process. Any remedial activities and the associated safety protocols and control measures would be similar to those described in Table III.K-2 (Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects). At a Bay Fill site like Candlestick Point, a site mitigation plan may instead take a similar approach to the one taken by the Navy to address Bay Fill materials at HPS Parcel B. As described above, that approach involved Institutional Controls and implementation of Risk Management Plans with the placement of recorded deed restrictions on the property, if necessary, to limit uses or activities on the property to ensure any significant environmental or health and safety risk is mitigated. Implementation of this measure would ensure that potential adverse effects on human health and the environment from construction activities disturbing known subsurface hazards would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-1b **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with known contaminants from historic uses. (Less than Significant with Mitigation)** ***[Criteria K.b and K.d]***

Implementation of HPS Phase II would involve construction to accommodate new development within that area, as shown in Figure II-4 and in Table II-2 in Chapter II. Site preparation would include deep excavations for large structures such as residential towers; installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. This impact specifically addresses potential hazards associated with landward soils that could be encountered during construction. Potential impacts associated with sediment that could be disturbed during shoreline improvements are evaluated in Impact HZ-10.

As described in the Setting, HPS Phase II is going through a remediation process independent of the Project, and property could transfer or be leased or accessed for limited activities, such as installation of infrastructure, before or after completion of remediation activities. To the extent that the property under development contains hazardous materials at the time of development, potentially significant impacts could result from exposure to such hazardous materials by workers, occupants, and visitors if controls are not in place to manage the risks from such exposure.

As discussed above, the Navy, USEPA, DTSC, RWQCB, and CDPH will, independent of the Project and this EIR, require that before any Project development activity occurs at HPS, appropriate and legally enforceable environmental restrictions on uses and activities at the Project site be in place and applicable to that activity, whether in the form of a recorded covenant, deed provision, easement, or lease term. The nature of the expected restrictions are described in detail in the "Regulatory Process for Cleanup Process at HPS Phase II" in Section III.K.2, above. Such restrictions will have been approved by the FFA Signatories as being sufficient under CERCLA and other applicable laws to ensure protection of human health and the environment during and after the development activity process, and the FFA Signatories will have approved a Land Use Control Remedial Design Document, or similar documents, identifying the specific mechanisms to be used to implement and enforce the restrictions. Although these restrictions and enforcement mechanisms will be established independent of this EIR, the mitigation measures identified in this EIR, including mitigation measure MM HZ-1b, would provide redundant protection by requiring that all Project development activities and uses conducted after the completion of development be in compliance with these environmental restrictions.

Such restrictions are expected to be applicable both to development activities that take place before remediation is complete (e.g., if the property is subject to an early transfer), and to development activities that take place after remediation is complete (e.g., if the property is transferred after a FOST), or if the property is leased or accessed through a license or easement and limited development activities like asbestos and lead-based paint abatement or building demolition are permitted under the terms of the lease, or infrastructure is installed under a license or easement). Although use and activity restrictions may be more stringent before remediation is complete, it is expected that restrictions will still be necessary after remediation is complete in most or all areas of HPS Phase II.

To reduce impacts related to exposure to known contaminants from construction activities at HPS Phase II to a less-than-significant level, the following mitigation measure shall be implemented.

MM HZ-1b *Compliance with Requirements Imposed by Cleanup Decision Documents and Property Transfer Documents. (Applies only to HPS Phase II) Prior to obtaining a grading, excavation, site, building or other permit from the City for development activity at HPS Phase II involving subsurface disturbance, the Project Applicant shall submit documentation acceptable to the San Francisco Department of Public Health that the work will be undertaken in compliance with all notices, restrictions, and requirements imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOST, FOSET or FOSL, including notices, restrictions, and requirements imposed in deeds, covenants, leases, easements, and LIFOCs, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans, Community Involvement Plans, and health and safety plans. Such restrictions, imposed by federal and state regulatory agencies as a condition on the Navy transfer of the property to the Agency, will ensure that the property after transfer will be used in a manner that is protective of the environment and human health. The City/Agency may choose to implement this measure by requiring these actions as part of amendments to San Francisco Health Code Article 31, which currently sets forth procedural requirements for development in HPS Phase I, or through an equivalent process established by the City or Agency.*

With implementation of this mitigation measure, for areas not planned for residential development, the restrictions in the Covenant and Deed will prohibit use of the property as a residence, hospital, school, or day care center, unless the FFA Signatories approve a specific proposal for such a use. In most non-

residential areas, and residential areas, it is anticipated that there will be a restriction against excavation or disturbance of soil or groundwater unless either a site-specific workplan is approved by the FFA Signatories, or the activity is consistent with an applicable RMP pre-approved by the FFA Signatories. In a few specific areas, such as IR 7/18 in Parcel B, the Building 123 area in Parcel B, and the former landfill in Parcel E-2, it is expected that there will be special restrictions associated with protecting the integrity of waste containment structures or ongoing treatment systems and with implementing the operation and maintenance plan for those remedies. For parcels subject to early transfer under a FOSET, the restrictions may be more severe until cleanup actions are completed, but restrictions are still expected to be imposed at most or all areas after remediation is complete because the ubiquitous nature of low levels of hazardous materials in Bay Fill makes it infeasible to remediate all of those materials. The specific mechanisms used to implement and enforce the activity restrictions in the covenant and deed(s) will be set forth in a Land Use Control Remedial Design document approved by the FFA Signatories.

If the Navy transfers property under a lease or LIFOC, as explained previously, under CERCLA, the terms of the lease or LIFOC would contain restrictions similar to those described above that would be contained in a Covenant and deed under an early transfer. Although these restrictions will be imposed independent of this EIR through separate environmental regulatory processes, to ensure compliance with these restrictions prior to development activities that disturb soil or groundwater, mitigation measure MM HZ-1b would require SFDPH to verify, before all development activities at HPS Phase II that disturb soil or groundwater occur that the activities would be done in compliance with all applicable restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOST, FOSET or FOSL, or License Agreement, including restrictions imposed in deeds, covenants, leases, and LIFOCs, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-1 **Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with known contaminants from historic uses. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Construction activities associated with the Project would involve extensive construction to accommodate new development within that area, as shown in Figure II-4 and in Table II-2 in Chapter II. Site preparation could include deep excavations for large structures such as residential towers; cut material may be used elsewhere within the Project site as fill, subject to certain restrictions; installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. Those activities could result in exposure to known contaminants at the Project site that could expose construction workers, the public, or the environment to hazardous materials. Implementation of mitigation measure MM HZ-1a would reduce effects related to exposure of known contaminants at Candlestick Point, including construction activities at CPSRA, by requiring compliance with Article 22A or an equivalent process. For construction activities at HPS Phase II, mitigation measure MM HZ-1b would require SFDPH to verify, before all development activities at HPS Phase II that disturb soil or groundwater occur, that the activities would be done in compliance with all applicable restrictions imposed for the site by requiring compliance

with additional Article 31 sections for specific parcels or an equivalent process. Implementation of these measures would ensure that potential adverse effects on human health and the environment from exposure to known subsurface hazards from construction activities would be reduced to a less-than-significant level.

Impact HZ-2: Exposure to Previously Unidentified Contaminants During Construction

Impact of Candlestick Point

Impact HZ-2a **Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with previously unidentified subsurface contaminants from historic uses. (Less than Significant with Mitigation) *[Criterion K.b]***

As at any development in an urban setting, particularly one to be constructed on Bay Fill, there is a potential for construction activities at Candlestick Point to encounter previously unidentified hazards, such as an abandoned underground storage tank located before permitting requirements were imposed, or other hazards. Exposure of construction workers, the public, or the environment to such hazards could result in a significant impact. The purpose of Article 22A is to minimize this potential at construction sites on Bay Fill, by requiring a site evaluation and soil sampling. If the results of the evaluation and testing indicate hazardous wastes are present in soil, site mitigation measures must be identified and a site mitigation report submitted to SFDPH, prior to commencement of construction activities. Nevertheless, there is still some potential that unidentified hazardous material releases could be encountered after compliance with the Article 22A process. For example, if an unidentified UST were discovered during construction activities, it would have to be closed in place or removed. Removal activities could pose both health and safety risks, such as the exposure of workers, tank handling personnel, and the public to tank contents or vapors. Similarly, the discovery of buried debris that could be hazardous could also present an increased risk of adverse health or environmental effects.

The likelihood that significant adverse effects would result from the discovery of previously unidentified USTs is minimal because there are multiple existing requirements in place to address such effects, such as Article 22A, RWQCB, and SFDPH UST removal and site cleanup requirements, implementation of contingency monitoring procedures and RWQCB notification (as necessary), and implementation of a site-specific health and safety plan (HASP) prepared in accordance with Cal/OSHA regulations.

To reduce impacts related to exposure to unknown contaminants at Candlestick Point, the following mitigation measure shall be implemented.

MM HZ-2a.1 *Unknown Contaminant Contingency Plan. (Applies to Candlestick Point, HPS Phase II, and off-site improvements.) Prior to obtaining the first site, building or other permit for development activities involving subsurface disturbance, the Project Applicant shall prepare and the San Francisco Department of Public Health shall approve a contingency plan to address unknown contaminants encountered during development activities. This plan, the conditions of which shall be incorporated into the first permit and any applicable permit thereafter, shall establish and describe procedures for implementing a contingency plan, including appropriate notification to nearby property owners, schools, and residents and appropriate site control procedures, in the event unanticipated subsurface hazards or hazardous material releases are*

discovered during construction. Control procedures would include, but would not be limited to, further investigation and, if necessary remediation of such hazards or releases, including off-site removal and disposal, containment or treatment. In the event unanticipated subsurface hazards or hazardous material releases are discovered during construction, the requirements of this unknown contaminant contingency plan shall be followed. The contingency plan shall be amended, as necessary, in the event new information becomes available that could affect the implementation of the plan. This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b.

MM HZ-2a.2 *Site-Specific Health and Safety Plans. (Applies to Candlestick Point, HPS Phase II, and off-site improvements.) Prior to obtaining the first site, building or other permit for the Project from the City for development activities involving subsurface disturbance, the Project Applicant shall prepare and submit to SFDPH a site-specific health and safety plan (HASP) in compliance with applicable federal and state OSHA requirements and other applicable laws to minimize impacts to public health and the environment. Implementation of the plan shall be required as a condition of any applicable permit. The plan shall include identification of chemicals of concern, potential hazards, personal protective equipment and devices, and emergency response procedures. The HASP shall be amended, as necessary, in the event new information becomes available that could affect the implementation of the plan.*

This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b.

Implementation of mitigation measure MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. Implementation of those measures would ensure that potential adverse effects on human health and the environment from unidentified subsurface hazards would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-2b **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with previously unidentified subsurface contaminants from historic uses. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

As noted in the Setting, there have been a number of investigations and actions to identify and remove subsurface structures (e.g., USTs, utility lines) at HPS Phase II and to manage identified contamination from those historic uses. Although these efforts have been extensive, the potential still exists for unidentified, old, or abandoned subsurface structures to be present at sites to be developed in HPS Phase II; in particular, it has not always been feasible to conduct physical investigation or comprehensive soil testing to determine the presence of USTs or the extent, if any, of soil contamination underneath existing buildings and structures.

If an unidentified UST were discovered during construction activities, it would have to be closed in place or removed. Removal activities could pose both health and safety risks, such as the exposure of workers, tank handling personnel, and the public to tank contents or vapors. Similarly, the discovery of buried debris that could be hazardous could also present an increased risk of adverse health or environmental effects. The likelihood that significant adverse effects from the discovery of previously unidentified USTs would occur is minimal because there are multiple existing requirements in place to address such effects, such as the RWQCB's requirement to prepare and implement parcel-by-parcel CAPs comprehensively addressing petroleum issues, and the SFDPH UST removal and site cleanup requirements, implementation of contingency monitoring procedures and RWQCB notification (as necessary).

Implementation of mitigation measure MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations, in conjunction with implementation of mitigation measure MM HZ-2a.2, which would require the preparation of a site-specific HASP prepared in accordance with federal and state OSHA and other applicable regulations. Implementation of those measures would ensure that potential adverse effects on human health and the environment from unidentified subsurface hazards would be reduced to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-2 **Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil and/or groundwater with previously unidentified subsurface contaminants from historic uses. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

As at any development in an urban setting, particularly one to be constructed on Bay Fill, there is a potential for construction activities associated with the Project to encounter previously unidentified hazards, such as an abandoned underground storage tank located before permitting requirements were imposed, or other hazards. Exposure of construction workers, the public, or the environment to such hazards could result in a significant impact. Implementation of mitigation measures MM HZ-2a.1 would require the development of an unknown contaminants contingency plan. Mitigation measure MM HZ-2a.2 would require the preparation and implementation of a site-specific health and safety plan. Implementation of mitigation measures MM HZ-2a.1 and MM HZ-2a.2 would ensure that potential adverse effects on human health and the environment from unidentified subsurface hazards would be reduced to a less-than-significant level.

Impact HZ-3: Off-Site Transport and Disposal of Contaminated Soil and Groundwater

Impact of Candlestick Point

Impact HZ-3a **Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of off-site transport and disposal of contaminated soil and groundwater. (Less than Significant with Mitigation) *[Criterion K.b]***

For those locations within Candlestick Point where remediation or UST removal could require off-site transport of contaminated soil or groundwater, exposure to hazardous materials could result if these materials were not handled appropriately during transport or disposal. These materials could be classified as a hazardous waste under federal or state regulations depending on the specific characteristics of the materials. The generator of the hazardous wastes would be required to follow federal or state regulations for characterization of and manifesting of the wastes, using licensed hazardous waste haulers, and disposing the materials at an appropriately permitted disposal or recycling facility. Soil or groundwater containing petroleum and other chemical products that do not meet the regulatory definition of hazardous waste would still be subject to special disposal requirements under RWQCB regulations and solid waste laws. These measures are described under Impact HY-1a in Section III.M. To reduce potential impacts of groundwater discharge to separate stormwater systems, mitigation measure MM HY-1a.3 would require the Project Applicant to prepare and implement a dewatering plan and comply with applicable standards to protect receiving water quality and anticipated SFPUC and/or RWQCB permit compliance provisions.

In addition, if construction in Candlestick Point would require dewatering of groundwater, a release of hazardous materials could occur, potentially resulting in exposure to the public and the environment. If dewatering were required, the groundwater could be discharged to the City's combined storm and sanitary sewer system in compliance with the Industrial Waste Ordinance, *Public Works Code*, Article 4.1, and Order No. 158170 of the DPW (refer to Section III.M for a discussion of Article 4.1 and Order No. 158170 and with SFPUC discharge guidelines). These regulations require a permit for discharge to the combined sewer, sampling of the water to be discharged and establish discharge limitations and other discharge criteria. Article 4.1 also prohibits discharge of hazardous wastes into the Combined Sewer System.

Under the Industrial Waste Ordinance, the discharged water would need to be sampled prior to and possibly during dewatering (depending on permit conditions) to demonstrate that discharge limitations in the ordinance were met. If the pumped groundwater would not meet discharge requirements, on-site pretreatment may be required before discharge to the sewer system. If standards could not be met with on-site treatment, the SFPUC may allow the discharger to pay a premium to discharge the wastewater to the system, or the discharger may need to transport the wastewater off site using a certified waste hauler. Thus, compliance with the Industrial Waste Ordinance and mitigation measure MM HY-1a.3 would ensure that potential adverse effects on human health and the environment from discharge of contaminated water to the sewer system would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-3b **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of off-site transport and disposal of contaminated soil and groundwater. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Construction activities in HPS Phase II could involve extensive construction to accommodate new development. Site preparation could include deep excavations for large structures such as residential towers; cut material may be used elsewhere as fill, subject to certain restrictions; installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. To the extent that the property under development contains hazardous materials at the time of development, some soils may need to be removed and disposed of off site.

For those locations within HPS Phase II where construction would require off-site transport of contaminated soil, the remediation contractor would be required, as necessary and where required, to follow state and federal regulations for manifesting (including transportation and disposal) the wastes, using licensed hazardous waste haulers, and disposing the materials at a permitted disposal or recycling facility. The ICs and, if applicable, Risk Management Plans, would set forth the process for approval or specific approved methods for disposal of excavated soils during grading or removal of groundwater during dewatering.

Likewise, the ICs and, if applicable, Risk Management Plans would establish a process for regulatory agency approval that will describe the procedure that must be followed to ensure that extraction of groundwater that may be necessary to accommodate trenching for utilities would not alter the physical or chemical characteristics of contaminant plumes. If dewatering were required, the groundwater could be discharged to the City's combined storm and sanitary sewer system provided the discharged water complied with the Industrial Waste Ordinance, *Public Works Code*, Article 4.1, and Order No. 158170 of the DPW (refer to Section III.M for a discussion of Article 4.1 and Order No. 158170 and with SFPUC discharge guidelines). The discharged water may be required to be sampled both prior to and during dewatering to demonstrate that discharge limitations in the ordinance are met. If the pumped groundwater would not meet discharge requirements, on-site pretreatment would be required before discharge to the sewer system. If standards could not be met with on-site treatment, the SFPUC may allow the discharger to pay a premium to discharge the wastewater to the system, or the discharger may need to transport the wastewater off site using a certified waste hauler. In addition mitigation measure MM HY-1a.3 would require the Project Applicant to prepare and implement a dewatering plan and comply with applicable standards to protect receiving water quality and anticipated RWQCB permit compliance provisions. Thus, compliance with the ICs and, if applicable, Risk Management Plans, the Industrial Waste Ordinance, and implementation of MM HZ-1b and would ensure that potential adverse effects on human health and the environment from disposal of dewatered groundwater would be reduced to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-3 **Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of off-site transport and disposal of contaminated soil and groundwater. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Construction associated with the Project where remediation activities would require off-site transport of contaminated soil or groundwater, exposure to hazardous materials could result if these materials were not handled appropriately during transport or disposal. At HPS Phase II, the ICs and, if applicable, Risk Management Plans, would set forth the process for approval or specific approved methods for disposal of excavated soils during grading or removal of groundwater during dewatering. For all construction and remediation activities associated with the Project requiring transport of contaminated soil or groundwater, compliance with existing federal, state, and local regulations and implementation of mitigation measures MM HZ-1b and MM HY-1a.3 would ensure that potential adverse effects on human health and the environment from disposal of dewatered groundwater would be reduced to a less-than-significant level.

Impact HZ-4: Installation of Underground Utilities

Impact of Candlestick Point

Impact HZ-4a **Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels hazardous materials as a result of improvements to existing and installation of new underground utilities. (Less than Significant with Mitigation) *[Criterion K.b]***

Development in Candlestick Point would involve the improvement of underground utilities as well as the installation of new utilities. There is the potential to encounter hazardous materials in soil and/or groundwater during work on underground utilities that, if encountered, could potentially expose workers or the environment to hazardous materials. Utility trenches have the potential to create a horizontal conduit for chemical contaminants contained in soil vapors or shallow groundwater to migrate along permeable soils that would be placed as trench backfill. In the event hazardous materials are encountered, the Agency would require the construction contractor to follow proper health and safety precautions and to dispose of contaminated soil and groundwater safely and legally, as discussed above. Installation of utilities bayward of the 1851 high-tide line would also be subject to the requirements of Article 22A. The potential for contaminants to be encountered is addressed by the requirement in mitigation measure MM HZ-2a.1 to prepare an unknown contaminant contingency plan. If contaminants were encountered in a location where piles are to be installed, the site mitigation plan required by Article 22A and mitigation measure MM HZ-1a would specify procedures necessary to prevent pile installation from creating a vertical conduit for chemicals occurring in shallow groundwater to move along the pile to deeper groundwater zones, and avoid degradation of the deeper groundwater. The measure would require all excess fill or native soil materials generated during pile driving to be properly managed. Implementation of mitigation measures MM HZ-1a and MM HZ-2a.1 would ensure the safe handling of potentially contaminated materials encountered during improvement or installation of underground utilities and effects on human health and the environment would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-4b **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels hazardous materials as a result of improvements to existing and installation of new underground utilities. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Development in HPS Phase II would involve the improvement of underground utilities to serve new development. As described above for Candlestick Point, utility trenches have the potential to create a horizontal conduit for chemical contaminants contained in soil vapors or shallow groundwater to migrate along the permeable soils that would be placed as trench backfill. The areas of the site that require vapor or groundwater utility cutoffs and the performance standard for these systems will be identified in the remedial design documents that must be prepared under the CERCLA process before these activities can be carried out. Compliance with the ICs and any applicable RMPs, and implementation of mitigation measures MM HZ-1b, MM HZ-2a.1, and MM HZ-2a.2 would avoid or minimize the potential for horizontal migration of contaminants in HPS Phase II, which would reduce effects to less-than-significant levels. Underground utility construction off site, or in portions of HPS Phase II retained by the Navy to support development of the Project in areas the Navy has transferred, is discussed in Impact HZ-11. Those measures would ensure the safe handling of potentially contaminated materials encountered during improvement or installation of underground utilities and effects on human health and the environment would be reduced to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-4 **Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels hazardous materials as a result of improvements to existing and installation of new underground utilities. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Construction of the Project would involve the improvement of underground utilities as well as the installation of new utilities. There is the potential to encounter hazardous materials in soil and/or groundwater during work on underground utilities that, if encountered, could potentially expose workers, the public, or the environment to hazardous materials. Implementation of mitigation measure MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-2a.2 would ensure the safe handling of potentially contaminated materials encountered during improvement or installation of underground utilities and effects on human health and the environment would be reduced to a less-than-significant level.

Impact HZ-5: Installation of Foundation Support Piles

Impact of Candlestick Point

Impact HZ-5a **Construction at Candlestick Point would not create vertical conduits for hazardous materials that could contaminate groundwater as a result of installation of foundation support piles. (Less than Significant with Mitigation) *[Criterion K.b]***

Candlestick Point is principally underlain by fill materials that overlie a thick sequence of Bay Mud (refer to Section III.L). Additional clay units and bedrock underlie the Bay Mud. Foundation support piles would be driven from the surface to various depths within Candlestick Point to provide structural support for various building and structure features. Unless properly managed and depending on the depth and location of the support piles, shallow groundwater could be encountered as a result of this activity. Groundwater generation is not a concern when driving piles. Piles installed in locations where contaminants have been identified could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to move along the pile to deeper groundwater zones, causing degradation of the deeper groundwater, a potentially significant impact.

Piles installed at Candlestick Point generally would extend through the Young Bay Mud to develop friction support in the underlying Old Bay Clay. In certain locations, the piles could extend through the Old Bay Clay to develop end support by resting on the bedrock that underlies the Project site. Prior to installing each pile, a pilot borehole would be drilled through the artificial fill to ensure the pile would pass undamaged and properly aligned through the debris and rubble that commonly is encountered in non-engineered fill materials. Drilling the pilot boreholes also would reduce the potential for the piles to push artificial fill that may contain hazardous constituents into the underlying sediments or groundwater, as could occur if the piles were driven from the ground surface without the benefit of pre-drilling. Mitigation measure MM HZ-5a would require pre-drilling pilot boreholes before pile driving in non-engineered fill material to avoid potential contaminant transport.

Because Bay Mud is soft, cohesive, and has a low permeability, the materials encountered during pile installation would adhere to the sides of piles during and after placement. This action would form a seal that would effectively prevent the formation of conduits for shallow groundwater to migrate downward into deeper water-bearing zones. Therefore, natural conditions would prevent the creation of a vertical conduit for chemicals moving from shallow intervals to deeper ones, or vice versa.

To reduce impacts related to potential groundwater contamination resulting from installation of foundation support piles at Candlestick Point, the following mitigation measure shall be implemented.

MM HZ-5a *Foundation Support Piles Installation Plan. (Applies to Candlestick Point and HPS Phase II.) Prior to obtaining a permit from the City that authorizes installation of deep foundation piles, the Project Applicant shall prepare and submit a plan acceptable to the City stating that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. This measure shall be implemented for Candlestick Point through implementation of mitigation measure MM HZ-1a. This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b.*

Implementation of mitigation measure MM HZ-5a would reduce potential groundwater quality impacts from pile driving to less-than-significant levels by ensuring compliance with Articles 22A and 31 and preparation of a plan for pilot boreholes for each pile to prevent disturbance of potentially contaminated fill materials.

Impact of Hunters Point Shipyard Phase II

Impact HZ-5b **Construction at HPS Phase II would not create vertical conduits for hazardous materials that could contaminate groundwater as a result of installation of foundation support piles. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

HPS Phase II is principally underlain by fill materials that overlie a thick sequence of Bay Mud (refer to Section III.L). If foundation support piles were used, shallow groundwater could be encountered during installation.

Piles installed in locations at HPS Phase II where contaminants have been identified could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to move along the pile to deeper groundwater zones, causing degradation of the deeper groundwater. Piles generally would extend through the Young Bay Mud to develop friction support in the underlying Old Bay Clay. In certain locations, the piles could extend through the Old Bay Clay to develop end support by resting on the bedrock that underlies the Project site. Prior to installing each pile, a pilot borehole would be drilled through the artificial fill to ensure the pile would pass undamaged and properly aligned through the debris and rubble that commonly is encountered in non-engineered fill materials. Drilling the pilot boreholes also would reduce the potential for the piles to push artificial fill that may contain hazardous constituents into the underlying sediments or groundwater, as could occur if the piles were driven from the ground surface without the benefit of pre-drilling. Mitigation measure MM HZ-5a would require pre-drilling pilot boreholes before pile driving in non-engineered fill material to avoid potential contaminant transport.

Restrictions that will apply upon transfer will dictate where pile driving will be permitted and under what circumstances. If permitted, all excess fill or native soil materials generated during pile driving would need to be managed consistent with the restrictions set forth in the ICs and any applicable Risk Management Plans as described above. Compliance with those restrictions through mitigation measures MM HZ-1b and MM HZ-5a would reduce potential groundwater quality impacts from pile driving to less-than significant levels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-5 **Construction activities associated with the Project would not create vertical conduits for hazardous materials that could contaminate groundwater as a result of installation of foundation support piles. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

The Project site is principally underlain by fill materials that overlie a thick sequence of Bay Mud (refer to Section III.L). Additional clay units and bedrock underlie the Bay Mud. Foundation support piles would be driven from the surface to various depths within the Project site to provide structural support for various building and structure features. Unless properly managed and depending on the depth and location of the

support piles, shallow groundwater could be encountered as a result of this activity. Groundwater generation is not a concern when driving piles. Piles installed in locations where contaminants have been identified could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to move along the pile to deeper groundwater zones, causing degradation of the deeper groundwater, a potentially significant impact. Implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-5a would reduce potential groundwater quality impacts from pile driving to less-than significant levels.

Impact HZ-6: Soil Handling, Stockpiling, and Transport Within the Project Site Boundaries

Impact of Candlestick Point

Impact HZ-6a **Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of handling, stockpiling, and transport of soil that may contain contaminants. (Less than Significant with Mitigation) *[Criterion K.b]***

Various construction activities in Candlestick Point, such as grading, trenching, compacting, and excavating soils, would result in soil being handled and moved. The excavated soil is expected to be used as fill elsewhere at Candlestick Point and possibly at HPS Phase II. Movement of soil that contains hazardous materials could result in impacts from human exposure to chemicals in the soil from dust and impacts to water quality and the environment if hazardous constituents were to migrate to the Bay. Movement of these soils also could result in impacts to air quality and water quality from the release of particulate matter to the air or sediment in storm water. Potential impacts from stockpiling and transport of these soils and associated dust control and stormwater management mitigation measures are discussed in greater detail in Section III.H (Air Quality) and Section III.M (Hydrology and Water Quality). Potential impacts associated with sediment that could be disturbed during shoreline improvements are evaluated in Impact HZ-10a

Soil excavated from portions of Candlestick Point that are subject to Article 22A and mitigation measure MM HZ-1a would be subject to restrictions or requirements imposed on soil movement or reuse within the Project site as part of any applicable site mitigation plan. Soil characterized as hazardous waste would be subject to applicable hazardous waste management, transportation, and disposal requirements under federal and state hazardous waste management laws. Transportation and reuse of soils not characterized as hazardous waste would be conducted in accordance with any applicable laws concerning nonhazardous soil transport and disposal.

Soil excavated from Candlestick Point could be transported to and reused at HPS Phase II only if (1) the soil were not characterized as hazardous waste under state or federal hazardous waste management regulations; and (2) the soil were to comply with any applicable soil import requirements related to what type of soil can be placed into particular areas of the site, imposed as part of the remediation program overseen by the FFA Signatories and/or by a RMP and/or by local ordinance. In the case of soils containing hazardous waste at Candlestick Point, the site mitigation plan would incorporate dust control measures, including placing covers on the trucks to reduce the potential for spreading material from one area to another or requiring that soil be sufficiently moist to prevent dust generation during transport. Further, whenever workers could be exposed to hazardous levels of chemicals, a site-specific HASP would

be prepared by the contractor prior to construction and would contain a section regarding decontamination of both personnel and equipment. The site mitigation plan would also address the potential for trespassers or visitors to gain access to construction sites and come into direct contact with native soils by specifying measures to prevent unauthorized entry into the construction site and provide appropriate monitoring/enforcement procedures to ensure the effectiveness of site security.

Soil handling, stockpiling, and transport activities have the potential to create erosion and potential migration of soils into the Bay during rainstorms, absent implementation of management measures. Soils could contain contaminants such as metals and organic compounds, which could degrade water quality in the Bay. Implementation of measures to control stormwater runoff during construction would also control discharge of potential chemicals adhered to soil in the runoff. These measures are described under Impact HY-1a in Section III.M and include implementation of a Stormwater Pollution Prevention Plan (SWPPP) and best management practices (BMPs) for construction sites. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP to identify the specific measures and BMPs that are applicable to Candlestick Point construction activities in the event of a spill or exposure of hazardous materials.

Compliance with the procedures described above would ensure that soil handling, stockpiling, and movement within Candlestick Point would not present a significant risk to human health and the environment, and would also reduce the potential for inadvertent exposure of adults and children to contaminated soils. Therefore, with implementation of Article 22A, mitigation measures MM HZ-1a, MM HY-1a.1, and MM HY-1a.2, impacts related to handling, stockpiling, and transport of contaminated soil would be reduced to less-than-significant levels.

Impact of Hunters Point Shipyard Phase II

Impact HZ-6b **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of handling, stockpiling, and transport of soil that may contain contaminants. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Various construction activities at HPS Phase II, such as grading, trenching, compacting, and excavating, would result in soil being handled and moved. The excavated soil may be used as fill elsewhere at HPS Phase II, to the extent permissible under the restrictions discussed below, but would not be reused at CPSRA or any other off-site locations. Movement of soil that contains hazardous materials could result in impacts from human exposure to chemicals in the soil from dust and impacts to water quality and the environment if hazardous constituents were to migrate to the Bay. Movement of nonhazardous soils also could result in impacts to air quality and water quality from the release of particulate matter to the air or sediment in storm water. Potential impacts from stockpiling and transport of nonhazardous soils and associated dust control and stormwater management mitigation measures are discussed in greater detail in Section III.H (Air Quality) and Section III.M (Hydrology and Water Quality). Potential impacts associated with sediment that could be disturbed during shoreline improvements are evaluated in Impact HZ-10b.

Restrictions on handling, stockpiling and transport of soil during construction activities at HPS Phase II will be a component of the legally-enforceable restrictions on uses and activities at the Project site described above (refer to the "Management of Hazardous Materials Contamination Risks During Development" section) which the Navy, USEPA, DTSC, RWQCB, and CDPH will, independent of the Project and this

EIR, require be in place before any Project development activity occurs at HPS Phase II. Although these restrictions will be imposed independent of this EIR through independent environmental regulatory processes, to ensure compliance with these restrictions prior to development activities, mitigation measure MM HZ-1b would require SFDPH to verify, before any development activity at HPS Phase II occurs, that it would be done in compliance with all restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOST, FOSET or FOSL, or License Agreement, including restrictions imposed in deeds, covenants, leases, and LIFOCs, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans, and health and safety plans. Those legally enforceable restrictions would incorporate dust control measures such as covers on the trucks to reduce the potential for spreading material from one area to another or requiring that soil be sufficiently moist to prevent dust generation during transport. Further, whenever workers could be exposed to hazardous levels of chemicals, a site-specific HASP would be prepared by the contractor prior to construction and would contain a section regarding decontamination of both personnel and equipment. The restrictions would also address the potential for trespassers or visitors to gain access to construction sites and come into direct contact with contaminated soils by specifying measures to prevent unauthorized entry into the construction site and provide appropriate monitoring/enforcement procedures to ensure the effectiveness of site security.

Those legally enforceable restrictions would incorporate dust control measures such as covers on the trucks to reduce the potential for spreading material from one area to another or requiring that soil be sufficiently moist to prevent dust generation during transport. Further, whenever workers could be exposed to hazardous levels of chemicals, a site-specific HASP would be prepared by the contractor prior to construction and would contain a section regarding decontamination of both personnel and equipment. The restrictions would also address the potential for trespassers or visitors to gain access to construction sites and come into direct contact with contaminated soils by specifying measures to prevent unauthorized entry into the construction site and provide appropriate monitoring/enforcement procedures to ensure the effectiveness of site security.

Soil handling, stockpiling, and transport activities have the potential to create erosion and potential migration of soils into the Bay during rainstorms, absent implementation of management measures. Soils could contain contaminants such as metals and organic compounds, which could degrade water quality in the Bay. Implementation of measures to control stormwater runoff during construction would also control discharge of potential chemicals adhered to soil in the runoff. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP would be required to identify the specific measures and BMPs that are applicable to HPS Phase II construction activities in the event of a spill of construction materials or exposure of hazardous materials. The SWPPP would identify the specific measures that are applicable to HPS Phase II construction.

As a result of these controls and mitigation measures, including mitigation measures MM HZ-1b, MM HY-1a.1, and MM HY-1a.2, impacts related to handling, stockpiling, and transport of contaminated soil would be reduced to less-than-significant levels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-6 **Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the handling, stockpiling, and transport of soil that may contain contaminants. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Project construction activities, such as grading, trenching, compacting, and excavating, would result in soil being handled and moved. The excavated soil is expected to be used as fill elsewhere at within the Project site. Handling, stockpiling, and transport of soil that contains hazardous materials could result in impacts from human exposure to chemicals in the soil from dust and impacts to water quality and the environment if hazardous constituents were to migrate to the Bay. For all construction associated with the Project requiring handling, stockpiling, or transport of soil, compliance with existing federal, state, and local regulations and controls and implementation of mitigation measures MM HZ-1a, MM HZ-1b, MM HY-1a.1, and MM HY-1a.2 would ensure that potential adverse effects on human health and the environment would be reduced to a less-than-significant level.

Impact HZ-7: Contaminated Surface Runoff from Construction Sites

Impact of Candlestick Point

Impact HZ-7a **Construction at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials that could be present in stormwater runoff. (Less than Significant with Mitigation) *[Criterion K.b]***

Construction activities at Candlestick Point, such as the compaction and installation of fill, grading, and other geotechnical work have the potential to remove the vegetative cover from parts of the site, spill soils onto roads, or otherwise create the potential for erosion or movement of soils from the Project site and potentially into surface waters during rain storms, absent implementation of management measures. Implementation of measures to control stormwater runoff during construction would also control potential discharge of chemicals, if chemicals were present in the runoff. These measures are described under Impact HY-1a in Section III.M and include implementation of a SWPPP and BMPs for construction sites. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP to identify the specific measures and BMPs that are applicable to Candlestick Point construction activities in the event of a spill or exposure of hazardous materials.

The actual control measure(s) that would be implemented would be developed to account for the specific characteristics of each site, contaminant type and concentrations, potential exposure pathways, and populations that could be at risk. Implementation of these measures, which would be identified in a site-specific SWPPP, would be adequate to control human health and environmental exposure from unremediated, if any, soil and/or groundwater sites that are unknown but may be encountered during construction at Candlestick Point. The types of actions likely to be required by a site mitigation plan and unknown contaminant contingency plan are included in mitigation measures MM HZ-1a and MM HZ-2a.1. Therefore, there would not be a significant hazard to the public or the environment involving release of contaminated surface runoff into the environment. Implementation of mitigation

measures MM HZ-1a, MM HZ-2a.1, MM HY-1a.1, and MM HY-1a.2 would ensure that potential adverse effects on human health and the environment would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-7b **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials that could be present in stormwater runoff. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Construction activities at HPS Phase II, such as the compaction and installation of fill, grading, and other geotechnical work have the potential to remove the vegetative cover from parts of the site, spill soils onto roads, or otherwise create the potential for erosion or movement of soils from the Project site and potentially into surface waters during rain storms, absent implementation of management measures. Implementation of measures to control stormwater runoff during construction would also control discharge of potential chemicals if present in the runoff. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP to identify the specific measures and BMPs that are applicable to HPS Phase II construction activities in the event of a spill of construction materials or exposure of hazardous materials. The SWPPP would identify the specific measures that are applicable to HPS Phase II construction.

The actual control measure(s) that would be implemented would be developed to account for the specific characteristics of each site, contaminant type and concentrations, potential exposure pathways, and populations that could be at risk. Implementation of these measures, which would be identified in a site-specific SWPPP, would be adequate to control human health and environmental exposure from unremediated, if any, soil and/or groundwater sites that are unknown, but may be encountered during construction at HPS Phase II. Therefore, there would not be a significant hazard to the public or the environment involving release of contaminated surface runoff into the environment. Implementation of mitigation measures MM HY-1a.1, MM HY-1a.2, MM HZ-1b, and MM HZ-2a.1 would ensure that potential adverse effects on human health and the environment would be reduced to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-7 **Construction activities associated with the Project would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials that could be present in stormwater runoff. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Project construction activities, such as the compaction and installation of fill, grading, and other geotechnical work have the potential to remove the vegetative cover from parts of the site, spill soils onto roads, or otherwise create the potential for erosion or movement of soils from the Project site and potentially into surface waters during rain storms, absent implementation of management measures. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP to identify the specific measures and BMPs that are applicable to construction activities in the event of a spill of construction materials or exposure of hazardous materials. Implementation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HY-1a.1, and MM HY-1a.2 would ensure that potential adverse effects on human health and the environment would be reduced to a less-than-significant level.

Impact HZ-8: Exposure to Hazardous Materials Releases That Have Not Been Fully Remediated

Impact HZ-8 **Project occupants or visitors in or near portions of HPS Phase II where remediation has not been fully completed would not be exposed to unacceptable levels of hazardous materials. (Less than Significant with Mitigation)** ***[Criteria K.b and K.d]***

As presented in the Setting, the results of comprehensive basewide and parcel-specific investigations have shown that chemicals and radioactive materials are present in soil and groundwater in various locations throughout HPS Phase II at levels that require remediation. As described above in the "Overview of the Environmental Investigation and Cleanup Process" section, the Navy has completed substantial investigation and remediation of the site and the FFA Signatories overseeing the remediation program have required interim measures to be put in place in areas that still require remediation. This would ensure that while remediation continues, the site would not pose a risk to persons or the environment outside of the ongoing remediation locations. Those measures include numerous actions to remove hazardous materials from soil and groundwater at the site, cleaning up shoreline debris, placing a temporary cap on the landfill at Parcel E-2 and securing areas still undergoing remediation with fencing. The cleanup required by the regulatory agencies will continue to be implemented by the Navy regardless of whether or not the Project is implemented.

In addition to the numerous cleanup activities for more conventional contaminants that are complete, underway, or are planned for each parcel within HPS Phase II, the Navy has prioritized the removal of all radiologically contaminated soils throughout the entire HPS Phase II site. This includes removal of former utility lines and impacted soils. Completion of radiological remedial actions will occur on each parcel prior to transfer of that parcel to the Agency.

As described above, RODs for many of the parcels have either been completed or are planned for completion in late 2009. Nevertheless, the remediation design documents necessary to carry out full remediation have not been developed nor approved. Further, while remediation investigations have been undertaken and remedies for Parcels C, E, E-2, and F have been refined, RODs have not been approved. Therefore, full remediation of the entire HPS Phase II site is not anticipated until after commencement of Project-related construction activities on, and perhaps occupancy of, portions of HPS Phase II. As described under Regulatory Framework, above, property in HPS Phase II could be transferred or leased (or accessed for limited purposes under a license or easement) to the Agency in advance of complete cleanup in two ways: FOSET or FOSL/LIFOC. Further, property that is fully remediated could be transferred to the Agency under a FOST while the Navy continues with remediation activities on other parcels.

Two types of impacts could be associated with occupancy on or near portions of HPS Phase II where remediation has not been fully completed. First, persons who would be present in portions of HPS Phase II prior to its complete remediation could be exposed to risks from exposure to hazardous materials releases that have not been fully remediated. Second, remediation activities themselves (e.g., soil excavation and groundwater treatment) could occur simultaneously with nearby construction and occupancy of new structures located in nearby areas where remediation has been completed; if not properly managed, these remediation activities could result in occupants or visitors being exposed to hazardous materials exposed

or emitted during the remediation activities. Both potential impacts of occupancy on or near sites where remediation has not been fully completed are addressed in this section. As described below, the risk of either type impact is not substantial because of the physical characteristics and administrative controls already in place. Nevertheless, the analysis in this section conservatively assumes there could be some risk to occupants or visitors in or near portions of HPS Phase II where remediation has not been fully completed, although that risk would be small.

The risk of exposure to hazardous materials releases in areas where remediation has not been fully completed is small, for the following reasons. First, all buildings and parcels within HPS Phase II have been investigated for chemical and radiological contamination. Second, human health risk assessments have been prepared to determine which locations could present a risk, and to determine approaches to cleanup. Where hazards existed that posed an immediate risk, the Navy has either removed the contaminant(s) or restricted access to those locations. Third, Parcels B, C, D-1, D-2, UC-1, UC-2, and at least half of Parcels E and G are covered with buildings, pavement, or other solid surfaces that would limit the amount of exposed soil that could become mobilized by wind or water. Fourth, as the Navy continues the cleanup of HPS, risks from unremediated hazardous materials releases will be further reduced throughout Project development. The potential risk to future occupants, workers, and visitors to unremediated sites would decrease.

The small risk of occupants or visitors being exposed to hazardous materials released will be addressed by the restrictions required by Navy cleanup documents such as CERCLA RODs, Petroleum Corrective Action Plans, FOSTs, FOSETs, FOSLs, Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans and restrictions set forth in property transfer documents, such as deeds, covenants, easements, LIFOCs. and short-term leases.

The principal purpose of the restrictions imposed at sites transferred or leased prior to completion of cleanup activities, under a FOSET or FOSL, are to ensure that the unremediated hazardous material releases will not pose a risk to occupants or visitors. This is accomplished through use restrictions (e.g., restrictions against residences, schools, childcare centers), through activity restrictions (e.g., restrictions against disturbing soil), and through site security requirements (e.g., fencing and signs around excavation sites). The restrictions imposed in FOSETS or FOSLs, and also those imposed on properties where cleanup is determined to be complete under a FOST, are designed to protect not only occupants and visitors on the parcel itself, but also on nearby property. This is sometimes accomplished through conservatively establishing the boundaries of the area subject to restrictions, to include a "buffer zone" establishing a safe distance from the area that was remediated. Similarly, restrictions may be imposed to address the potential of migration from nearby parcels where remediation has not been fully completed. This is sometimes accomplished through an ongoing monitoring requirement to determine if a groundwater plume, or methane, from an adjacent area has migrated, or it may be accomplished through a requirement to install vapor barriers to prevent exposure from releases from the adjacent property.

Compliance with the restrictions in these documents, which is required by MM HZ--1b, would reduce the potential impact of exposure to hazardous materials releases to occupants and visitors on or near portions of HPS Phase II where remediation has not been fully completed to less than significant.

As indicated above, occupants or visitors at or near portions of HPS Phase II where remediation activities have not been fully completed could also be exposed to hazardous materials as a result of remediation activities themselves, if physical controls and administrative procedures are not in place to manage that risk. Such remediation activities could include excavation and transport of contaminated soils to an off-site treatment or disposal facility, in-situ treatment of soils (e.g., soil vapor extraction), or groundwater treatment (with chemicals) that could expose occupants and visitors to contaminated dusts, soil gases, and other contaminated material. Table III.K-2 (Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects) provides an overview of the types of remediation activities, potential human health, and environmental effects associated with each activity for each parcel, and the types of measures that EPA, DTSC, and the Regional Water Board will require the Navy to implement to control exposures from such activities to people in proximity to the activities.

As a result of the protective measures described in Table III.K-2 that the environmental regulators will require the Navy to implement, the potential impact to occupants or visitors on or near portions of HPS Phase II from exposure to hazardous materials exposed or emitted during remediation activities conducted by the Navy is less than significant.

To the extent this impact could still be potentially significant despite the Navy's implementation of these protective measures, it would be reduced to less than significant through implementation of Mitigation Measure MM HZ-1b, which requires compliance with restrictions in cleanup and transfer documents. The determinations of suitability for transfer or lease made in FOSETs, FOSTs, and FOSLs all take into account the potential for ongoing remediation activities to be conducted on the parcel (in the case of a FOSET or FOSL) or on a nearby parcel (in the case of a FOST) to impact occupants or visitors; if such a risk is identified, the FOSET, FOSL or FOST would impose restrictions to address the risk.

Potential impacts to occupants or visitors from remediation activities that may be conducted by or on behalf of the Agency or the Project Applicant are addressed by MM HZ-12, which requires compliance with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order on Consent. This includes all restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans.

Impact HZ-9: Exposure to Hazardous Materials in Conjunction with Limited Remediation Activities During Construction of the Yosemite Slough bridge

Impact HZ-9 **Construction at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of Yosemite Slough bridge construction. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

The Project would include construction of a bridge crossing the narrowest part of the South Basin portion of the Yosemite Slough to link Candlestick Point with HPS Phase II. The northern access point for the bridge would be at the edge of Parcel E and Parcel E-2, in an area where radiological contaminants are suspected to be present below the surface (refer to Figure III.K-1).

Table III.K-2 Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects

	Parcels in Which Remedial Action Could Occur						
Remedial Action	*B*	*C, UC-2*	*D (includes D-1, UC-1, and G)*	*E/ E-2*	*F*	*Potential Environmental Effects and Sources*	*Methods to Reduce Effects*
				SOIL REMEDIATION			
Removal							
Conventional Excavation/ Temporary Stockpiling	X	X	X	X	X	Air emissions; contact with soil; potential infiltration of contaminants to groundwater; contaminants carried in stormwater runoff; inadvertent spread of contamination	Air monitoring and engineering controls; health and safety plan; covering soil stockpiles; NPDES (National Pollutant Discharge Elimination System) stormwater SWPPP; site security
Dredging					X	Air emissions from dredging equipment; contact with sediments; remobilization or spread of contaminants into surface water	Air monitoring and engineering controls; coffer dams, barriers and liners; health and safety plan; NPDES SWPPP
After excavation or dredging, off-site treatment, and/or disposal	X	X	X	X	X	After excavation, truck traffic and associated noise, criteria air pollutant emissions; inadvertent spread of contamination	Selecting best truck route, dust control measures (freeboard and tarping), decontaminating equipment leaving site
On-Site Physical/Chemical Treatment							
Soil Vapor Extraction	X	X				Air emissions, noise	Comply with BAAQMD regulations for emissions source controls; air monitoring; use mufflers on equipment and/or enclosures; health and safety plan
Active Landfill Gas Control System				X		Vapors from methane extraction	Air monitoring; soil gas monitoring
Containment							
Soil Covers	X	X	X	X	X	Soil movement, placement, compaction—air emissions, noise	Air monitoring and engineering controls; health and safety plan; covering stockpiled sediments; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
Asphalt and Concrete Covers	X	X	X	X		Air emissions from asphalt, air emissions from heavy equipment	Air monitoring and engineering controls; health and safety plan; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
Maintained Landscaping	X	X	X	X		Subsurface irrigation maintenance	Adequate cover with clean fill

Table III.K-2 Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects

	Parcels in Which Remedial Action Could Occur						
Remedial Action	*B*	*C, UC-2*	*D (includes D-1, UC-1, and G)*	*E/ E-2*	*F*	*Potential Environmental Effects and Sources*	*Methods to Reduce Effects*
Shoreline Revetment	X	X		X	X	Construction of revetment – heavy equipment emissions, noise, visual, disturbance of shoreline aquatic systems	Air monitoring and engineering controls; health and safety plan; covering stockpiled sediments; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
Multilayer Cap	X (IR7/18)			X		Construction of cap – air emissions and noise from equipment, construction site runoff into Bay	Air monitoring and engineering controls; health and safety plan; covering soils; NPDES stormwater SWPPP; site security
Geosynthetic Cap	X (IR 7/18)			X		Construction of cap – air emissions and noise from equipment, construction site runoff into Bay	Air monitoring and engineering controls; health and safety plan; covering soils; NPDES stormwater SWPPP; site security
Backfilling	X	X	X	X	X	Dust emissions from placement of fill, air emissions from heavy equipment, construction site runoff into Bay	Air monitoring and engineering controls; health and safety plan; covering soils; NPDES stormwater SWPPP; site security
Cofferdam				X	X	Construction of coffer dam – air emissions and from equipment, visual, construction site runoff, disturbance of shoreline aquatic systems	Air monitoring and engineering controls; health and safety plan; covering stockpiled sediments; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
						GROUNDWATER REMEDIATION	
Monitoring	X	X	X	X		Water sampling would involve minimal physical disturbance	Health and safety plan; quality assurance plan
Monitored Natural Attenuation (passive)		X		X		Monitoring would involve collecting and analyzing groundwater samples, which would involve minimal physical disturbance	Health and safety plan; quality assurance plan
In-Situ Chemical Treatment	X	X	X	X		Transport of chemical products to site, operation and maintenance of pumps – air, noise emissions	Air monitoring and engineering controls; health and safety plan; compliance with state and local hazardous materials use/storage regulations; site security
Vapor Controls	X	X	X	X		Collection of vapors in enclosed spaces – inhalation hazard, possible explosion hazard	Groundwater Soil Vapor Extraction (SVE) program, monitoring, vapor barriers in buildings

Table III.K-2 Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects

	Parcels in Which Remedial Action Could Occur						
Remedial Action	*B*	*C, UC-2*	*D (includes D-1, UC-1, and G)*	*E/ E-2*	*F*	*Potential Environmental Effects and Sources*	*Methods to Reduce Effects*
SEDIMENT AND SURFACE WATER REMEDIATION							
Removal/Backfill					X	Dust emissions from excavation; noise and air emissions from heavy equipment; contact with sediment; potential for contaminated sediments to be carried in stormwater runoff to Bay; potential to affect aquatic resources	Air monitoring and engineering controls; health and safety plan; covering stockpiled sediments; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
Removal and Off-Site Disposal	X	X	X	X	X	Dust emissions from excavation; noise and air emissions from heavy equipment. After excavation, truck traffic and associated noise, criteria air pollutant emissions; inadvertent spread of contamination; contact with sediment	In addition to above, selecting best truck route, dust control measures (freeboard and tarping), decontaminating equipment leaving site
Armored Cap/Aquablok Cap					X	Construction of cap—air emissions and noise from equipment, potential for cap materials to be carried into surface water; permanent visual effect; potential to affect aquatic resources	Air monitoring and engineering controls; health and safety plan; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
In-Situ Stabilization					X	Emissions and noise from heavy equipment	Air monitoring and engineering controls; health and safety plan; NPDES stormwater SWPPP; federal and state permit/mitigations to protect aquatic resources; site security
Monitored Natural Recovery					X	Monitoring would involve collecting and analyzing sediment and water samples, which would involve minimal physical disturbance	Specified monitoring protocols.
Monitoring	X	X	X	X	X	Same as above	Same as above

SOURCE: Compiled by PBS&J from Navy HPS reports.

- It is expected that construction of the bridge would occur in the early phase of the Project, likely before the Navy completes remediation of Parcels E and E-2. This section describes the impacts that could occur under such a scenario due to the presence of radiological materials and the actions that would be taken to address the presence of radiological materials within the bridge construction area.

  If soil, sediment, or debris containing radiological contamination were disturbed, this could expose construction workers to hazards associated with radiological materials. The public and the environment could also be at risk if the excavated materials were not properly managed.

  To access the bridge construction site from HPS Phase II, excavation of the potentially radiologically contaminated area must first be completed. Before any work beings, a removal action workplan would be submitted to and approved by the FFA Signatories and the CDPH. The workplan would include the same types of safety protocols and control measures included in previously approved workplans for the Navy's ongoing excavations of the radiologically impacted sewer lines and storm drains throughout HPS. In addition, the area to be excavated (work corridor) would be established in conjunction with design work and identified in the work plan, and all construction documents would indicate the boundary of excavation work corridor. No excavation would take place outside that boundary.

  The safety protocols and control measures would include the following:

  - The contractor will implement radiological control program including set up of designated lay down areas, radiological control areas, and exclusion zones.
  - All personnel working on the site will receive specific training as required to perform the work specified.
  - The contractor will implement an erosion and stormwater management plan including installation of erosion and stormwater control measures.

  The approach to clearing the corridor to allow construction would involve excavating materials that would be tested for radiological materials as the soil is removed. As noted above, only soils within the corridor boundary would be excavated and tested. To accomplish this, the contractor would mobilize radiological sorting equipment and all other construction vehicles and equipment to the site required to execute the Project. Pilot tests would be performed to calibrate the equipment that ensure the sorting process is working properly and the contractor is achieving the required screening levels. Excavation would begin from the water's edge and work towards Crisp Road (on HPS Phase II), and would keep the material handling on the non-screened area to minimize any cross contamination. Material would first be excavated to depth and stockpiled near the sorting equipment for access with a loader. Material would next pass through a screen to remove oversized material and cobbles, then through a tumbler to break up clods of dirt. It would then fall onto a conveyor system and pass through a bank of detectors to measure the level of radiological activity, if any. Material that fails the desired screening level would be directed to a separate conveyor and the remaining material would be directed to a different conveyor and stockpiled for reuse as backfill. Any material that exceeds screening levels or re-use criteria would be stockpiled and sampled for off-site disposal at an approved facility. As the excavation proceeds, the screening plant and conveyor system would be moved, staying on non-cleared areas to prevent cross-contamination. Once the excavation has met the required depth (excavation would extend no deeper than the water table), verification sampling would be performed to ensure radiological constituents have been removed. Once verified clean, a 12-inch-wide concrete retaining wall would be installed from the bottom of the excavation to two feet above

final grade to act as a permanent vertical barrier between the radiologically impacted area and the newly cleared area for street construction. Material verified as clean would be used as backfill to bring the site back up to grade for street construction.

In addition to the specific safety protocols and control measures described above, the approved removal action workplans would incorporate applicable requirements to control potential impacts from dust and other air emissions and to prevent migration of contaminants to groundwater or stormwater, as set forth in Table III.K-2. To reduce the impact related to exposure to contaminated soil during construction of the Yosemite Slough bridge, the following mitigation measure shall be implemented.

MM HZ-9 *Navy-approved workplans for construction and remediation activities on Navy-owned property. (Applies only to the portions of HPS Phase II on Navy-owned property). Construction activities and remediation activities conducted on behalf of the Agency or the Project Applicant, on Navy-owned property shall be conducted in compliance with all required notices, restrictions, or other requirements set forth in the applicable lease, easement, or license or other form of right of entry and in accordance with a Navy-approved workplan. This mitigation measure also requires that such activities be conducted in accordance with applicable health and safety plans, dust control plans, stormwater pollution prevention plans, community involvement plans, or any other documents or plans required under applicable law. The City/Agency will access Navy property through a lease, license, or easement. The City/Agency shall not undertake any activity or approve any Project Applicant activity on Navy-owned property until the Navy and other agencies with approval authority have approved a workplan for the activity. The requirement to comply with the approved work plans shall be incorporated into and made a condition of any City/Agency approvals related to activities on Navy property. This measure shall be implemented for HPS Phase II through a process established by the City or Agency as explained in MM HZ-1b.*

The general requirement of mitigation measure MM HZ-9 would apply to the Yosemite Slough bridge remediation activities by requiring that remediation activities conducted in conjunction with the construction of the Yosemite Slough bridge be performed only after approval by the FFA Signatories and the CDPH, of a removal action workplan for excavation of radiologically contaminated materials. The safety protocols and control measures expected to be included in that workplan. This mitigation measure further requires the excavation to be conducted in accordance with the requirements of that workplan and of other applicable health and safety plans, dust control plans, stormwater pollution prevention plans or any other document or plan required under applicable law, including, but not limited to applicable requirements illustrated in Table III.K-2.

As a result of these Project controls and mitigation measures, the potential for exposure to hazardous materials during remediation activities conducted in conjunction with the construction of the Yosemite Slough bridge would be reduced to less-than-significant levels.

Impact HZ-10: Exposure to Hazardous Materials during Construction of Shoreline Improvements

Impact of Candlestick Point

Impact HZ-10a **Construction in the shoreline areas at Candlestick Point would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of sediment or soil that may contain chemical contaminants. (Less than Significant with Mitigation)** ***[Criteria K.b and K.d]***

The Project would include shoreline improvements along Candlestick Point. These improvements would include the placement of additional (rock) riprap, creation of a sandy recreational beach at the mid-point of the Wind Meadow reach along the Eastern Shoreline, and creation of new tidal habitat in several locations.

As described in the Setting and in Impact HZ-1a, there are no known releases of hazardous materials requiring remediation in the portions of Candlestick Point bayward of the 1851 high-tide line, but the detection of low-levels of hazardous materials in 1998 and general knowledge of the types of material that can be in Bay fill lead to the conclusion that there is a potential for exposure to hazardous materials from development activity in these areas. Installation of the proposed shoreline improvements have the potential to disturb sediments overlying and/or derived from Bay fill, which could contain hazardous materials. The primary effect of disturbance of sediment that could contain hazardous materials would be re-suspension of hazardous materials adhering to sediment, which could enter surface water, which could, in turn, affect water quality and/or aquatic species.

Impact HY-1a in Section III.M provides a comprehensive description of the required permits and additional mitigation that would require site-specific controls to minimize sediment disturbance to reduce water quality effects. Mitigation measures MM HY-1a.1 and MM HY-1a.2 require that the Stormwater Pollution Prevention Plan (SWPPP) include specific best management practices (BMPs) to minimize the potential transport of sediment, debris, and construction materials to the Lower Bay during construction of shoreline improvements. Where possible and necessary, excavation and construction of improvements would be implemented prior to removal of existing structures. Materials management and construction BMPs would be implemented to minimize potential discharges to the Lower Bay or disturbance of sediment. All BMPs would be included in related permits/permit requirements obtained for construction of Shoreline Improvements (e.g., USACE 404 permit, SFRWQCB 404 certification, BCDC/DMMO permit). Following removal/replacement of structures, exposed surfaces would be stabilized with hardscape, vegetation, or bioengineered features, as feasible.

Impact BI-2, Impact BI-4a, Impact BI-10a, Impact BI-11a, and Impact BI-12a in Section III.N (Biological Resources) describe the effect of shoreline sediment disturbance on aquatic species and mitigation measures to reduce those effects. The general requirements of mitigation measures MM BI-4a.1 and MM BI-4a.2 (described in Section III.N) would reduce the effects of construction-related activities on aquatic habitat by requiring that appropriate permits be obtained from the USACE, SFRWQCB, BCDC, and other agencies as applicable (MM BI-4a.1) and implementing construction BMPs (MM BI-4a.2) to reduce and/or prevent impacts to waters of the United States, including aquatic habitats.

The potential risks to construction workers and the public would be reduced through implementation of mitigation measure MM HZ-1a, which would reduce effects related to exposure of known contaminants at Candlestick Point, including construction activities at CPSRA, by requiring compliance with Article 22A or an equivalent process to identify and manage potential hazards. In the event previously unidentified contamination is found in sediments during shoreline improvements, implementation of mitigation measure MM HZ-2a.1 would ensure the appropriate steps are taken to minimize exposure to people and the environment.

Therefore, there would not be a significant hazard to the public or the environment from hazardous materials as a result of shoreline improvements in Candlestick Point. Implementation of mitigation measures MM BI-4.a.1, MM BI-4.a.2, MM HY-1a.1, MM HY-1a.2, MM HZ-1a, and MM HZ-2a.1 would ensure that potential adverse effects on human health and the environment would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-10b **Construction in the shoreline areas at HPS Phase II would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of sediment or soil that is radiologically affected or that may contain chemical contaminants. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

The Project would include several shoreline improvements, which are described in Chapter II. Many of the improvements would involve work within the Bay (e.g., the marina, modifications to berths, wharves, and drydocks, installation of marina breakwater). For such features, and others, that would occur within the Bay and do not require anchoring, foundations, or other contact with sediment, submerged lands, or rock, the primary environmental effects associated with those improvements would be related to water quality or increased turbidity, which could affect aquatic species. Refer to Impact BI-2, Impact BI-4b, Impact BI-5b, Impact BI-10b, Impact BI-11b, and Impact BI-12b in Section III.N for additional information about those effects. Some of the proposed shoreline improvement activities that may potentially disturb sediments and impact submerged lands include pile-driving, construction of rock buttresses, dredging, riprap installation, marina construction and installation of natural-looking shoreline protection using fill and articulated concrete block (ACB) mats.

HPS Phase II parcels where shoreline improvements affecting sediment could occur are limited to Parcels B, C, E/E-2, and F. All sediments that may be affected by these shoreline improvements, however, are contained within Parcel F. Because of the known presence of contamination in sediment within Parcel F, the Navy is in the process of preparing a ROD for Parcel F. Once a ROD is approved, remediation can occur. Any remedies for radiologically impacted material will be implemented by the Navy prior to transfer. The options for remediating potentially affected sediment could include removing the sediment or capping in place as per the ROD. Sediments found to be non-hazardous would not require remediation and will be left in place. It is also possible that shoreline improvements could occur after the Navy has capped sediments in place and these improvements could disturb the cap. Shoreline improvements would be completed in accordance with mitigation measures MM HZ-1b, MM HZ-10b, MM HZ-12, and the RMPs.

As previously described, RODs have been finalized for Parcels B, D-1, G, UC-1 and UC-2. RODs have not been completed for Parcels C, D-2, E/E-2, and F but are expected in the late 2009 to summer 2012

timeframe. Depending on the development schedule relative to the remaining RODs and their subsequent implementation, sediments could be remediated by the Navy under CERCLA in advance of Project Applicant activities, in which case all necessary administrative and physical controls would be in place that would minimize potential hazards to the occupants, the public, construction workers and the environment from exposure to hazardous materials in sediment. If the shoreline improvements require disturbance of sediments capped in place, work will be completed in accordance with mitigation measures MM HZ-1b, MM HZ-10b, and MM HZ-12.

This impact analysis assumes a shoreline improvement scenario in which the Navy does not implement the selected remedy in the ROD for these parcels (with the exception of radiological contamination), and the Agency or the Project Applicant implements the remaining remediation activities in conjunction with shoreline improvement activities with appropriate regulatory oversight. Such remediation and shoreline improvement activities are considered part of the Project, and their potential impacts are analyzed here.

Because contaminants have been identified in those parcels for which a remedy has been selected but not yet implemented, construction of the shoreline improvements has the potential to disturb sediment or soil that may contain chemical contaminants at levels that could expose construction workers, the public, or the environment to hazardous materials if not properly managed.

(At some Navy shipyards, ordnance and munitions have been discovered in offshore sediments as a result of offloading from ships during wartime. There is no evidence of this at HPS. HPS is not considered a Military Munitions Program Site, so hazards associated with munitions are not anticipated.)

One type of improvement is a development-related remediation activity that is expected to be the responsibility of the Agency or Project Applicant under the Parcel B ROD. That activity involves construction of a shoreline revetment to prevent erosion of soil contaminants into the Bay. The Parcel B ROD requires construction and/or reconstruction of a revetment at two portions of the Parcel B shoreline: a 1,200-foot segment near IR Site 26, and a 230-foot segment near IR Site 23. The revetment would consist of 500-pound stones underlain by geotextile material. It is expected that a temporary cofferdam, water-filled barrier tube, select sheet piles or equivalent would be used during construction of the revetment.

Other shoreline improvements that could disturb sediment include: marina construction, a rock buttress along the submarine docks and repairs to or replacement of the caisson piles at the wharf along berths 55 to 61 (Parcel B); rock or sand buttress along Drydock 2, 3 and 4 only if sediment is in the drydock prior to buttress construction (Parcel C); and natural edge/riprap-protected slope for the proposed grasslands ecology park (Parcel E/E-2).

The following outlines the process that would be followed by Agency or Project Applicant in conjunction with development activities with appropriate regulatory oversight to manage potentially contaminated sediments that could be affected by Project shoreline improvements.

For sediments identified for removal, remedial design documents will be prepared and submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A Dredged Material Management Office (DMMO) permit will be required (refer to Section III.K.3). The design documents would incorporate the necessary shoreline improvements required for each specific area (e.g., rock buttressing, pile replacement, backfilling, riprap, or installation of natural-looking shoreline protection

using fill and ACB mats) such that remediation (removal of sediment and any necessary dredging) and shoreline improvements are performed under the same regulatory approvals and permits.

In instances where sediments are determined to be non-hazardous and allowed to be left in place but the proposed shoreline improvements require sediment removal, a dredging plan would be prepared and submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A DMMO permit would be required. Following sediment removal, improvements would proceed as described in the Project Description.

More specific approaches are proposed for locations where the shoreline improvements are proposed and the selected ROD remedy is to leave sediments in place with covers or caps, as described below. These additional measures are needed to ensure that already-completed remedies (e.g., the cover at E/E-2) are not compromised.

a. The installation of the rock buttress at Drydocks 5–7 (Parcel B) would be evaluated to determine if the placement of the rock would compromise the integrity of the Navy-installed cover. If the cover could be compromised, appropriate design documents describing how construction activities would be performed to mitigate environmental risk and to restore the cap would be prepared and submitted to the USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. Review by the DMMO may also be obtained.

b. If the inspection of the steel piles below the wharf at berths 55–61 (Parcel B) shows that piles need to be replaced by driving new piles, then proper design documents describing (1) how construction activities would be performed to mitigate environmental risk and (2) restore the cap would be prepared and submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. Review by the DMMO may also be obtained.

c. Two options are possible for Drydocks 2, 3, and 4 (Parcel C). If the cap remains in place, appropriate design documents describing how construction activities (rock buttressing) would be performed to mitigate environmental risk and restore the cap would be prepared and submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. If the sediment and cap would need to be removed, appropriate design documents would be produced for regulatory approval (USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH) describing the construction activities required for removal of the existing cap and contaminated sediment below. A plan describing removal of contaminated sediment and the methods used to determine that all contamination has been removed would be prepared and submitted to these agencies for approval. Following regulatory approval and the removal of the sediment from the drydocks, installation of the rock buttress may be completed as originally planned. Review by the DMMO may also be obtained.

d. The installation of natural-looking shoreline protection using fill and Articulated Concrete Block (ACB) mats along the shoreline of Parcels E and E-2 would be evaluated to determine if the placement of fill cover and ACB mats would compromise the integrity of the Navy-installed cover and riprap. If the cover may be compromised, design documents describing how construction activities would mitigate environmental risk and restore the cap would be prepared and submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. Even if it is determined that the cover would not be impacted by Project activities, review by the DMMO would likely be required.

MM HZ-10b *<u>Regulatory Agency–Approved Workplans and Permits for Shoreline Improvements.</u> Prior to undertaking any shoreline improvement activities that would affect sediment at HPS Phase II, the Agency or its contractor or Project Applicant shall prepare appropriate design documents and submit to USEPA,*

DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A Dredged Material Management Office (DMMO) permit shall be obtained. The design documents shall incorporate the necessary shoreline improvements required for each specific area (e.g., including, but not limited to, rock buttressing, pile replacement, backfilling, riprap, or installation of natural-looking shoreline protection using fill and ACB mats) such that remediation (removal of sediment and any necessary dredging) and structural improvements are performed under the same regulatory approvals and permits.

Prior to undertaking any shoreline improvement activities that could affect contaminated sediments left in place and covered or capped with a Navy-installed remedial measure, or that would involve pile replacement in such areas, the Agency or its contractor or Project Applicant shall prepare appropriate design documents that: (1) describes how the cover or cap would be inspected to determine whether proposed shoreline improvements would adversely affect the cover or cap; and (2) describes how construction activities would be performed to mitigate environmental risk and to restore the cover or cap. The design documents shall be submitted to USEPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A DMMO permit shall be obtained, as applicable.

Prior to undertaking any shoreline improvements that could encounter contaminated sediments, the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into the design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent. This includes all restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans. Prior to obtaining a grading, excavation, site, building, or other permit from the City that authorizes remedial activities, SFDPH shall confirm that the work proposed complies with the applicable plans required by the Administrative Order of Consent. This measure shall be implemented through additions to Article 31 or through an equivalent process established by the City or Agency as explained in MM HZ-1b.

This mitigation measure requires that all shoreline activities that could affect sediment be conducted in accordance with agency-approved design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. As a result of these Project controls and mitigation measures, the potential for exposure to hazardous materials during shoreline improvements construction activities would be reduced to less-than-significant levels.

Mitigation measures identified in Section III.M and Section III.N further reduce this impact. Mitigation measures MM HY-1a.1 and MM HY-1a.2 require that the Stormwater Pollution Prevention Plan (SWPPP) include specific best management practices (BMPs) to minimize the potential transport of sediment, debris, and construction materials to the Lower Bay during construction of shoreline improvements. The general requirements of mitigation measures MM BI-4a.1 and MM BI-4a.2 (described in Section III.N) would reduce the effects of construction-related activities on aquatic habitat, including special-status fish, by requiring that appropriate permits be obtained from the USACE, SFRWQCB, BCDC, and other agencies as applicable (MM BI-4a.1) and implementing construction BMPs (MM BI-4a.2) to reduce and/or prevent impacts to waters of the United States, including aquatic habitats. Potential impacts on eelgrass beds would be mitigated through mitigation measure MM BI-5b.4, which also requires BMPs specific to that sensitive natural community. Mitigation measure MM BI-12b.1 identifies additional sediment management controls to reduce the effects of construction-related activities on aquatic species.

With implementation of mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.4, MM BI-12b.1, MM HY-1a.1, MM HY-1a.2, and MM HZ-10b, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements in HPS Phase II would be reduced to a less-than significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-10 **Construction activities associated with the Project in shoreline areas would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of sediment or soil that may contain chemical or radiological contaminants. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

The proposed shoreline improvements along Candlestick Point and Hunters Point Phase II have the potential to disturb sediments that could contain hazardous materials. If sediment containing hazardous materials were released to the water, this could adversely affect water quality, and could also impact aquatic species. With implementation of mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.4, MM BI-12b.1, MM HY-1a.1, MM HY-1a.2, MM HZ-1a, MM HZ-2a.1, MM HZ-10b, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than significant level by ensuring locations where sediments containing hazardous materials have been identified, plans are developed and implemented to manage the sediment, all appropriate permits have been obtained, and best management practices (BMPs) are implemented.

Impact HZ-11: Exposure to Hazardous Materials While Constructing Infrastructure on Navy-Owned Property

Impact HZ-11 **Construction activities associated with the Project on Navy-owned property, including improvements to existing utilities and installation of new underground utilities, would not expose occupants, construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, or groundwater that may contain contaminants from historic uses, including radiological contaminants. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

It is expected that development of properties the Navy has transferred would require underground utilities be installed across land the Navy still owns and that may still be undergoing remediation. As described above, utility trenches have the potential to create a horizontal conduit for chemical contaminants contained in soil vapors or shallow groundwater to migrate along the permeable soils that would be placed as trench backfill. The easement or other legal instrument providing a right to access the Navy property would require underground utility excavation activities to be conducted in accordance with a Navy-approved workplan that will require implementation of measures to prevent such migration.

Mitigation measure MM HZ-1b would apply to development activities that take place before remediation is complete (e.g., if property is subject to an early transfer) or accessed through a license or easement.

MM HZ-1b requires the Project Applicant submit documentation to the SFDPH that the work will be undertaken in compliance with all restrictions imposed pursuant to the ICs and transfer documents.

The general requirement of mitigation measure MM HZ-9 would also apply to underground utility construction activities by requiring that such activities be conducted only after approval of a workplan by the Navy, and if required, by the other FFA Signatories. This mitigation measure would also require such underground utility construction activities be conducted in accordance with applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws. As a result of these Project controls and mitigation measures, the potential for exposure to hazardous materials during underground utility construction at HPS Phase II would be reduced to less-than-significant levels.

Impact HZ-12: Remediation Activities Conducted in Conjunction with Development Activities at HPS Phase II Early Transfer Parcels

Impact HZ-12 **Remediation activities conducted on behalf of the City or Project Applicant at the HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would not expose remediation and construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater that may contain contaminants from historic uses. (Less than Significant with Mitigation)** ***[Criteria K.b and K.d]***

Although the ongoing remediation activities conducted by the Navy under the FFA are not part of the Project, if any of the parcels are transferred prior to completion of remediation in an "early transfer" as described in the Regulatory Framework, the Agency or the Project Applicant may instead implement the remaining remediation activities in conjunction with development activities with appropriate regulatory oversight. Such remediation activities conducted by or on behalf of the Agency or Project Applicant are considered part of the Project, and their potential impacts are analyzed here.

The Navy and the Agency are currently evaluating an early transfer for Parcel B (except IR7/18) and Parcel G. Parcel C, and portions of Parcels D and E also are being considered for potential early transfers after the transfer of Parcels B and G. Early transfers are not being considered for Parcel E-2, the Parcel E shoreline area, or Parcel F. At parcels subject to early transfer, the Navy would be responsible for securing an approved ROD selecting the remedies prior to property transfer. The Navy would be responsible for completing all remediation activities associated with radiological materials prior to property transfer. Because the Navy has already conducted significant remedial activities, it is expected that the Navy may complete, before transfer, the initial installation of groundwater treatment systems and soil vapor extraction systems and conduct major soil excavations.

The remedial activities for which the Agency or the Project Applicant may be responsible include: covering Bay Fill areas with clean soil or other impervious surfaces such as pavement, concrete, or buildings; operating groundwater treatment systems and soil vapor extraction systems; implementing parcel-wide groundwater monitoring programs; performing soil vapor investigations to determine where it may be necessary to install soil vapor barriers underneath new buildings, and installing such barriers; reconstructing the shoreline revetment wall to protect ecological receptors along the Bay shoreline; excavating small "hot spots" in soil; and implementing and enforcing institutional controls.

Under the legal agreements that would be executed as part of an early transfer, the Agency and the Project Applicant are also likely to assume responsibility for remediating previously unidentified hazardous material releases discovered during redevelopment, to the extent the costs of such remediation are paid by environmental insurance secured with funds provided by the Navy. Those legal agreements are also expected to specify that the Navy will retain responsibility for addressing any radiological material releases and for addressing unidentified hazardous materials releases at HPS to the extent the costs of addressing such releases are not paid by environmental insurance secured with funds provided by the Navy. These legal agreements among the Navy, Agency, the Project Applicant, and the insurer would not alter the obligations to implement the mitigation measures identified in this EIR.

The remedial activities for which the Agency or the Project Applicant would be responsible at early-transferred parcels would be conducted by experienced engineering firms and environmental remediation contractors, as is also the case with the ongoing work supervised by the Navy. Under the AOC, which would be signed by the Agency, the Project Applicant, USEPA, DTSC, and the RWQCB before any early transfer, the Agency and Project Applicant's remedial activities would be subject to all of the same requirements, and subject to all of the same review by the FFA Signatory environmental agencies, as the Navy's ongoing work.

The remedial design documents and workplans that would be reviewed by the environmental agencies pursuant to the AOC include health and safety plans and would incorporate numerous requirements to ensure that the remedial activities would not cause exposures to hazardous materials that could pose a significant risk to human health and the environment. Table III.K-2 shows the potential environmental effects of different remedial activities and the measures that would be required in the documents and workplans approved by the environmental agency to control those effects.[335]

Many of the potential impacts of construction activities discussed in this section are also potential impacts of remediation activities. Therefore, the text notes where the discussion of impacts and mitigation measures referenced in those subsections would apply to site investigation and remediation activities.

Although the AOC will require the types of control measures described above and in Table III.K-2 independent of this EIR, to ensure compliance with these controls, mitigation measure MM HZ-12 would require SFDPH to ensure that before development occurs, the Agency or the Project Applicant and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development, as illustrated by the requirements set forth in Table III.K-2, and to conduct work in accordance with the RMPs. As a result of those Project controls and mitigation measures, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the Project Applicant in conjunction with development of HPS Phase II would be reduced to less-than-significant levels.

[335] This table includes remedial activities which will not be the responsibility of the Agency or the Project Applicant and activities on parcels which will not be early-transferred. These activities are included because they are relevant to the discussion earlier in this section of the impacts of occupancy of portions of HPS in proximity to other portions where Navy remediation may still be ongoing.

MM HZ-12 *Compliance with Administrative Order on Consent at Early Transferred Parcels. (Applies only at HPS Phase II.) Prior to undertaking any remediation activities at HPS Phase II on property that the Navy has transferred to the Agency as part of an early-transfer, the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, community involvement plans, and any other document or plan required under the Administrative Order on Consent. This includes all notices, restrictions, and requirements imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans, community involvement plans, and health and safety plans. Prior to obtaining a grading, excavation, site, building, or other permit from the City that authorizes remedial activities, SFDPH shall confirm that the work proposed complies with the applicable plans required by the Administrative Order of Consent. This measure shall be implemented through a requirement in the potential additions to Article 31 imposing requirements to parcels other than Parcel A or through an equivalent process established by the City or Agency.*

The specific types of requirements anticipated to be included in these documents and plans are illustrated in Table III.K-2. With the implementation of these mitigation measures, potential impacts from remediation activities conducted in conjunction with development activities at HPS Phase II early transfer parcels would be reduced to a less-than significant level.

Impact HZ-13: Exposure to Hazardous Materials Contamination During Construction of Off-Site Roadway Improvements

Impact HZ-13 **Construction of off-site roadway improvements would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials as a result of the disturbance of soil or groundwater that may contain contaminants. (Less than Significant) *[Criterion K.b]***

Location of Off-Site Roadway Improvements

The Project would improve existing roadways to serve Candlestick Point and HPS Phase II and surrounding Bayview and Hunters Point neighborhoods as described in Chapter II. Those improvements include:

- **Roadway Improvements:** Ingalls Street (from Carroll Avenue to Thomas Avenue), Thomas Avenue (from Ingalls Street to Griffith Street), and Griffith Street (from Thomas Avenue to Crisp Road) would be converted from two-lane to four-lane facilities. Existing on-street parking would be removed on Ingalls Street and Griffith Street to create the new facilities. Parking would be retained on both sides of Thomas Avenue. A new signal would be installed at the Thomas Avenue/Ingalls Street intersection.
- **Streetscape Improvements:** Innes Avenue/Hunters Point Boulevard, Palou Avenue, and Gilman Avenue would serve as primary access corridors from the north for pedestrians, bicyclists, transit vehicles, and automobiles. Streetscape improvements would include street trees, sidewalk plantings, furnishings, and paving treatments along Innes Avenue/Hunters Point Boulevard, Palou Avenue (from Crisp Road to Third Street), and Gilman Avenue.
- **Harney Way Improvements:** The existing four-lane roadway would be rebuilt as a new four-lane facility with right-of-way reserved for an additional westbound lane to be built in the future as needed for increased traffic levels. Six lanes would be constructed west of Thomas Mellon Drive to connect with the future modifications to the US-101 interchange. Two exclusive Bus Rapid Transit (BRT)

lanes would be constructed adjacent to the roadway in addition to the auto lanes. Left-turn lanes on eastbound Harney Way would be installed at the Thomas Mellon Drive and Executive Park Boulevard intersections to provide access to Executive Park.

- **Palou Avenue Transit Preferential Street:** One Muni line would be extended along Palou Avenue to serve the Hunters Point Shipyard Transit Center. In addition, two other lines would operate along Palou Avenue with service near the Project. In order to provide efficient, attractive service on these lines, transit preferential treatments including transit-priority technology would be implemented, including installation of new traffic signals along Palou Avenue to Third Street. To improve pedestrian comfort and the accessibility of transit in this corridor, new bus shelters would be installed and the street would be upgraded with ADA ramps, bulbouts, and crosswalks.

The Site History/Initial Site Assessment technical report prepared for the Bayview Transportation Improvements Project (currently under environemental review) reviewed environmental conditions at most of the locations described above where the off-site improvements may involve disturbance of soil or the existing asphalt cover.[336] At Griffith Street, Ingalls Street, and Carroll Avenue, the report concluded that historic and current land uses indicate the potential for hazardous substances to have been released at some locations along those roadways such that soil could have been affected. The Site History/Initial Site Assessment technical report did not include the segment of Palou Avenue where improvements are proposed. Previous investigations that identified historic uses, USTs, and sampling results along the alignments, along with a review of agency databases, show that many of the sites identified in the above-referenced Site History/Initial Site Assessment report have received regulatory closure. However, some locations may still require investigation or remediation, and there may be new sites that have not been comprehensively evaluated for the presence of hazardous materials contamination in soil at the specific locations where soil disturbance could occur.

Description of Construction Activities at Off-Site Roadway Improvements

Construction activities for off-site street improvements include the following: demolition of existing street and sidewalk; protection, replacement or relocation of existing underground utilities; signage and traffic light installation; asphalt/concrete paving; curb, gutter and ramp installation; striping; bus shelter installation; landscape installation including trees, shrubs and irrigation systems; street lighting installation; and electrical connection installation.

Typical excavation depths associated with these types of activities would range from 1 to 3 feet for roadway (including sidewalk, curb, gutter). For utility improvements along roadways, trench depths could be as shallow as 4-5 feet (e.g., landscape irrigation lines, dry utilities) to as much as 20-30 feet for storm drain and sewer facilities, depending on size and type. The width of disturbed area for roadways would depend on the right-of-way, but generally would range from 60 to 100 feet. For utility improvements, trenches would be approximately 1 to 4 feet wide for dry utilities and water lines, but could be up to 20 to 30 feet wide for storm and sewer components.

Off-site street improvements would be performed by first removing the existing pavement section. The existing pavement section consists of asphalt, concrete and an aggregate or Portland concrete cement (PCC)

[336] BASELINE Environmental, Bayview Transportation Improvements Project, Technical Report, Site History/Initial Site Assessment, June 2009.

base material. The existing pavement section would be removed by scraping the paving section away from the sub-base utilizing typical street construction equipment. The demolished material would either be reused as backfill or disposed of by trucking it to an off-site landfill that accepts construction debris, including asphalt, in accordance with pre-determined City haul route(s). Existing utilities would be protected in place, replaced, or relocated as needed prior to construction of the new street. The new asphalt/concrete pavement section would be installed per City structural section requirements and include an eight-inch PCC base. The curb, gutter, and ramps would be constructed of PCC. After installation of the new street structural sections the new street surface would be painted per a striping plan approved by the City. Other street improvements may then include signage, traffic lights, bus shelters, and street light installation.

The width and depth of proposed off-site improvements would determine the extent to which contaminants (if any) could be encountered during the construction activities.

The majority of the off-site roadway improvements are bayward of mean high tide line and thus subject to the requirements of *San Francisco Health Code* Article 22A, including, if required, the preparation and implementation of a site mitigation plan. Compliance with Article 22A would ensure that impacts from exposure to hazardous materials associated with off-site roadway improvements would be less than significant. No mitigation is required.

Impact HZ-14: Exposure of Ecological Receptors to Hazardous Materials

Impact of Candlestick Point

Impact HZ-14a **Construction at Candlestick Point would not expose ecological receptors to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater that may contain contaminants from historic uses. (Less than Significant with Mitigation) *[Criterion K.b]***

Site preparation would include deep excavations for large structures such as residential towers; installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. Additionally, there would be roadway improvements. These construction activities would involve grading, trenching, compacting, and excavating, which would result in soil and/or fill being handled, stockpiled, and moved on site.

Section III.N identifies the fish and wildlife species that could be affected by Project construction. These species include a broad range of resident and migratory fish and wildlife species. Common wildlife includes a number of species of invertebrates, reptiles and amphibians, birds, and mammals (terrestrial and aquatic). Common aquatic resources include many species of fish, shellfish, and mollusks.

There are no sites with known contamination requiring remediation at Candlestick Point, and no immediate risks to fish or wildlife have been identified for the Candlestick Point portion of the Project. However, as described in Impact HZ-2a, there is a potential for hazardous materials to be present in fill or soil materials bayward of the 1851 high tide line, or there is a possibility that previously unknown contamination could be discovered during site development. The reader is also referred to Impact HZ-1a and Impact HZ-2a for descriptions of the processes for determining whether contaminants are present in fill or soil, and, if contaminants are identified, mitigation measures MM HZ-1a and MM HZ-2a.1 prescribe the types of actions required by a site mitigation plan and unknown contaminant contingency plan.

To the extent that the property under development in areas underlain by fill or soils that could contain hazardous waste, soil disturbance and associated stockpiling and on-site soil movement could provide potential pathways through which fish and wildlife species could be exposed to contaminants in soil or fill material. Soil disturbance could be the result of general construction activities in which previously unidentified contaminants have been discovered, or it could be the result of implementation of mitigation deemed necessary through Article 22A testing to reduce an environmental hazard. The site mitigation report required under Article 22A would determine if there is a significant environmental risk, which would include risks to ecological systems, and if so, recommend measures that will mitigate the risks.

The primary environmental mechanisms for ecological exposure during soil disturbance would be (1) direct species contact with the fill or soil containing contaminants (e.g., birds landing on or rodents burrowing into stockpiled materials); (2) stormwater runoff from exposed soils or fill, or soils spilled onto roads during transport, which could carry contaminants into aquatic environments, where fish and benthic invertebrate species could be affected; or (3) windblown dust, which could be inhaled by terrestrial and avian species, or that could be deposited on surface water, where aquatic organisms could be affected.

There are controls and mitigation measures identified in this EIR that would reduce potential impacts on human populations, which would also help reduce the impact on ecological systems, as explained below. In addition, there are environmental conditions that would also reduce the potential for adverse impacts.

For example, the site mitigation plan required under Article 22A would incorporate measures, such as covering stockpiles, which would minimize the potential for avian and terrestrial species to have direct contact with soil. Implementation of measures to control stormwater runoff during construction would control the discharge of potential chemicals adhered to soil in the runoff. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP would be required to identify the specific measures and BMPs applicable to Candlestick Point construction activities in the event of a spill of construction materials or exposure of hazardous materials. This would reduce the likelihood of contaminants being conveyed to near-shore and offshore environments, which would reduce the risk to the aquatic environment and species that rely on that habitat (e.g., birds and mammals).

As described, dust control measures are required both by local ordinance and by BAAQMD. Implementation of dust control measures (mitigation measure MM HZ-15) would effectively reduce the potential for windborne dust that could affect fish and wildlife species. However, natural environmental conditions would also be a factor in minimizing the potential for contaminated dusts to adversely affect ecological systems. Avian species could be exposed to windblown dust through inhalation and ingestion during preening and prey consumption. Although various avian species use Candlestick Point for nesting and foraging, the mobility of the bird species results in their use of a relatively large home range and foraging range. Due to this mobility, avian species would not be present in one foraging area for an extended period of time in which they could receive substantial exposure to contaminants in dust. Windblown dust deposited onto water bodies could result in direct exposure to filter-feeding mollusks and other aquatic species. Additionally, excessive deposition of dust onto surface water, such as the Bay, could increase turbidity, which could, in turn, decrease light penetration into water and available oxygen. Even if dust control measures were not implemented, dusts generated by wind during construction would be dispersed over a relatively large area, with no single area receiving a sufficient volume of dust to generate a significant exposure to species.

Ponded water in open excavations and trenches (if contaminants were present and if standing water remained) could also present an ecological risk. However, because dewatering would be necessary to ensure proper construction conditions, groundwater would be removed routinely and frequently. Groundwater would either be pumped into the sewage system or to the Bay in accordance with the Industrial Waste Ordinance of the *Public Works Code*. The sewage system is a closed system, so there would be no direct exposure pathway to fish or wildlife. If shallow groundwater were to be pumped directly into the Bay as a necessary by-product of construction dewatering, the discharger would be required to notify and obtain approval of the RWQCB, as described in Section III.M (mitigation measure MM HY-1a.3). Any groundwater proposed for discharge from the Project site into the Bay must meet strict water quality standards established by the San Francisco Bay Basin Plan as defined by the RWQCB, and may have to be treated before discharge into the Bay to avoid potential degradation of the Bay's water quality. Furthermore, dischargers are required to meet stringent monitoring standards established by the RWQCB (and to a certain extent, the SWRCB) to ensure compliance under this permitting system. This would ensure potential aquatic impacts are minimized.

As explained in Impact HZ-10a, mitigation measures identified in Section III.N (Biological Resources) would also reduce impacts on ecological receptors. The general requirements of mitigation measures MM BI-4a.1 and MM BI-4a.2 (which are fully described in Section III.N) would reduce the effects of construction-related activities on aquatic habitat by requiring that appropriate permits be obtained from the USACE, SFRWQCB, BCDC, and other agencies, as applicable (refer to MM BI-4a.1) and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including aquatic habitats (refer to MM BI-4a.2).

Compliance with the procedures described above would ensure that soil handling, stockpiling, and movement, and construction dewatering within Candlestick Point would not present a significant risk to the ecological environment. Therefore, with implementation of Article 22A, and mitigation measures MM HZ-1a, MM HZ-2a.1, MM HZ-15, MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM BI-4a.1, and MM BI-4a.2, potential construction ecosystem impacts related to handling, stockpiling, and transport of contaminated soil (including shoreline sediments) and groundwater would be reduced to less-than-significant levels.

Impact of Hunters Point Shipyard Phase II

Impact HZ-14b **Construction at HPS Phase II would not expose ecological receptors to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater that may contain with contaminants from historic uses. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

This impact focuses on the potential for soil disturbance and associated stockpiling and on-site soil movement during general site construction activities to create potential pathways through which fish and wildlife species could be exposed contaminants in HPS Phase II site soils. The potential for development of Project elements such as the Yosemite Slough bridge and shoreline improvements to disturb contaminated soils or sediment is evaluated separately in Impact HZ-9 and Impact HZ-10, respectively. Impact BI-4a, Impact BI-4b, and Impact BI-4c-in Section III.N describe potential biological resources impacts associated with development of specific Project shoreline improvements. Potential water quality impacts associated with shoreline improvements are evaluated in Impact HY-1a, Impact HY-1b, and Impact HY-1 in Section III.M.

Site preparation would include deep excavations for large structures such as residential towers, installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. These construction activities would involve grading, trenching, compacting, and excavating, which would result in soil and/or fill being handled, stockpiled, and moved on site.

Section III.N (Biological Resources) identifies the fish and wildlife species that could be affected by Project construction. These species include a broad range of resident and migratory fish and wildlife species. Common wildlife includes a number of species of invertebrates, reptiles and amphibians, birds, and mammals (terrestrial and aquatic). Common aquatic resources include many species of fish, shellfish, and mollusks.

As presented in the Setting, the results of comprehensive basewide and parcel-specific investigations have shown that chemicals and radioactive materials are present in soil and groundwater in various locations throughout HPS Phase II at levels that require remediation. The Navy has completed substantial investigation and remediation of the site, and the FFA Signatories overseeing the remediation program have required interim measures to be put in place in areas that still require remediation. Those measures include numerous actions to remove hazardous materials from soil and groundwater at the site, and the cleanup required by the regulatory agencies will continue to be implemented by the Navy regardless of whether or not the Project is implemented. However, full remediation of the entire HPS Phase II site is not anticipated for several years.

Further, as with many sites with former industrial uses, there is the potential to discover previously unidentified contamination or debris, even though all reasonable efforts have been implemented to identify such hazards. There have also been a number of investigations and actions to identify and remove subsurface structures (e.g., USTs, utility lines) at HPS Phase II and to manage identified contamination from those historic uses. Although these efforts have been extensive, the potential still exists for unidentified, old, or abandoned subsurface structures to be present at sites to be developed in HPS Phase II; in particular, it has not always been feasible to conduct physical investigation or comprehensive soil testing to determine the presence of USTs or the extent, if any, of soil contamination underneath existing buildings and structures.

As described previously, given the substantial amount of earthwork that would occur in HPS Phase II, there may be situations in which it may be feasible and more cost-effective to perform some soil remedial actions in conjunction with installation of utilities or other redevelopment activities in HPS Phase II. For example, the "Combined Plan for Candlestick Point and Hunters Point Shipyard" suggests that remediation work could be implemented at the proposed stadium site in Parcel G as part of site preparation.[337]

The primary environmental mechanisms for ecological exposure during soil disturbance would be (1) direct species contact with the fill or soil containing contaminants (e.g., birds landing on or rodents burrowing into stockpiled materials); (2) stormwater runoff from exposed soils or fill, or soils spilled onto roads during transport, which could carry contaminants into aquatic environments, where fish and benthic invertebrate species could be affected; or (3) windblown dust, which could be inhaled by terrestrial and avian species, or that could be deposited on surface water, where aquatic organisms could be affected.

[337] San Francisco Redevelopment Agency, Hunters Point Shipyard Preliminary Hazardous Materials Remediation Plan, http://www.hunterspointcommunity.com/docs/pdfs/Exhibit_D_Preliminary_Hazardous_Materials_Remediation_Plan.pdf (accessed July 2009).

There are controls and mitigation measures identified in this EIR that would reduce potential impacts on human populations, which would also help reduce the impact on ecological systems, as explained below. In addition, there are environmental conditions that would also reduce the potential for adverse impacts.

For example, the site mitigation plans prepared pursuant to Article 31-equivalent requirements, and risk management plans prepared pursuant to CERCLA documents (refer to Impact HZ-1b) would incorporate measures, such as covering stockpiles, which would minimize the potential for avian and terrestrial species to have direct contact with soil. Implementation of measures to control stormwater runoff during construction would control discharge of potential chemicals adhered to soil in the runoff. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP would be required to identify the specific measures and BMPs that are applicable to HPS Phase II construction activities in the event of a spill of construction materials or exposure of hazardous materials. This would reduce the likelihood of contaminants being conveyed to near-shore and offshore environments, which would reduce the risk to the aquatic environment and species that rely on that habitat (e.g., birds and mammals). Mitigation measure MM HZ-10b would also minimize the potential for sediments disturbed during shoreline improvements to pose a hazard to near-shore and aquatic species.

As explained in Impact HZ-10b, mitigation measures identified in Section III.N would also reduce impacts on ecological receptors. The general requirements of mitigation measures MM BI-4a.1 and MM BI-4a.2 (described in Section III.N) would reduce the effects of construction-related activities on aquatic habitat by requiring that appropriate permits be obtained from the USACE, SFRWQCB, BCDC, and other agencies as applicable (MM BI-4a.1) and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including aquatic habitats (MM BI-4a.2). Mitigation measure MM BI-12b.1 identifies additional sediment management controls to reduce the effects of construction-related activities on aquatic species.

As described, dust control measures are required both by local ordinance and by BAAQMD. Implementation of dust control measures (mitigation measure MM HZ-15) would effectively reduce the potential for windborne dust that could affect fish and wildlife species. However, natural environmental conditions would also be a factor in minimizing the potential for contaminated dusts to adversely affect ecological systems. Avian species could be exposed to windblown dust through inhalation and ingestion during preening and prey consumption. Although various avian species use Candlestick Point for nesting and foraging, the mobility of the bird species results in their use of a relatively large home range and foraging range. Due to this mobility, avian species would not be present in one foraging area for an extended period of time in which they could receive substantial exposure to contaminants in dust. Windblown dust deposited onto water bodies could result in direct exposure to filter-feeding mollusks and other aquatic species. Additionally, excessive deposition of dust onto surface water, such as the Bay, could increase turbidity, which could, in turn, decrease light penetration into water and available oxygen. Even if dust control measures were not implemented, dusts generated by wind during construction would be dispersed over a relatively large area, with no single area receiving a sufficient volume of dust to generate a significant exposure to species.

Ponded water in open excavations and trenches (if contaminants were present and if standing water remained) could also present an ecological risk. However, because dewatering would be necessary to ensure proper construction conditions, groundwater would be removed routinely and frequently. Groundwater

would either be pumped into the sewage system or to the Bay in accordance with the Industrial Waste Ordinance of the *Public Works Code*. The sewage system is a closed system, with end of the line treatment, so there would be no direct exposure pathway to fish or wildlife. If shallow groundwater were to be pumped directly into the Bay as a necessary by-product of construction dewatering, the discharger would be required to notify and obtain approval of the RWQCB, as described in Section III.M (mitigation measure MM HY-1a.3). Any groundwater proposed for discharge from the Project site into the Bay must meet strict water quality standards established by the San Francisco Bay Basin Plan as defined by the RWQCB, and may have to be treated before discharge into the Bay to avoid potential degradation of the Bay's water quality. Furthermore, dischargers are required to meet stringent monitoring standards established by the RWQCB (and, as applicable, the State Water Resources Control Board) to ensure compliance under this permitting system. The requirements for construction dewatering would be specified in the ICs and RMPs for HPS Phase II. This would ensure potential aquatic impacts are minimized.

As explained in Impact HZ-10a, mitigation measures identified in Section III.N would also reduce impacts on ecological receptors. The general requirements of mitigation measures MM BI-4a.1 and MM BI-4a.2 (described in Section III.N) would reduce the effects of construction-related activities on aquatic habitat by requiring that appropriate permits be obtained from the USACE, SFRWQCB, BCDC, and other agencies as applicable (MM BI-4a.1) and implementing construction BMPs (MM BI-4a.2) to reduce and/or prevent impacts to waters of the United States, including aquatic habitats.

As described in Impact HZ-6b, restrictions on handling, stockpiling and transport of soil during construction activities at HPS Phase II will be a centerpiece of the legally-enforceable restrictions on uses and activities at the Project site described above (refer to the "Management of Hazardous Materials Contamination Risks During Development" section) and under which the Navy, USEPA, DTSC, RWQCB, and CDPH will, independent of this EIR, require to be in place before any Project development activity occurs at HPS Phase II.

Mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-10b, and MM HZ-12 require construction activities require construction and grading activities and remediation activities conducted in conjunction with development at early transfer parcels to comply with all restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOST, FOSET FOSL, or an Administrative Order on Consent applicable to early transfer parcels, including restrictions imposed in Deeds, Covenants, Leases, and LIFOCs, and requirements set forth in Land Use Control Remedial Design Documents, and Risk Management Plans. Under the applicable requirements of CERCLA, RCRA, and the equivalent state cleanup requirements, ecological risk assessments have been conducted to determine the potential impact of hazardous material releases on ecological receptors such as fish and wildlife species as described in the current conditions discussion in this Section. Under CERCLA RCRA and the equivalent state cleanup requirements and other applicable laws and regulations, impacts to the environment, including impacts to ecological receptors such as fish and wildlife species, must be taken into account in establishing these restrictions applicable to actions that disturb known or potential contaminants in soil, sediment, or water.

The general requirements of mitigation measures MM HZ-1b, MM HZ-9, MM HZ-10b, and MM HZ-12 would require that activities be conducted only after approval of a workplan by the Navy, and if required, by the other FFA Signatories. This mitigation measure would also require activities be conducted in accordance with any other documents or plans required under applicable law or laws.

Compliance with the procedures described above would ensure that soil handling, stockpiling, and movement within HPS Phase II would not present a significant risk to the ecological environment. Therefore, with implementation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-12b.1, potential construction ecosystem impacts related to handling, stockpiling, and transport of contaminated soil (including shoreline sediments) and groundwater would be reduced to less-than-significant levels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-14 **Construction activities associated with the Project would not expose ecological receptors to unacceptable levels of hazardous materials as a result of the disturbance of soil, sediment, and/or groundwater with contaminants from historic uses. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Site preparation would include deep excavations for large structures such as residential towers; installation of foundation piles; trenching for utility lines; grading and compaction; and other earth-disturbing activities. Additionally, there would be roadway improvements. These construction activities would involve grading, trenching, compacting, and excavating, which would disturb soil, sediment, and/or groundwater with potential contaminants from historic uses at levels that could expose ecological receptors (fish and wildlife species identified in Section III.N) to hazardous materials. With implementation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-9, MM HZ-10b, MM HZ-12, MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-12b.1, potential construction ecosystem impacts related to handling, stockpiling, and transport of contaminated soil would be reduced to less-than-significant levels.

Impact HZ-15: Exposure to Naturally Occurring Asbestos

Impact HZ-15 **Construction and grading activities associated with the Project would not disturb soil or rock that could be a source of naturally occurring asbestos in a manner that would present a human health hazard. (Less than Significant with Mitigation) *[Criterion K.b]***

Background on Naturally Occurring Asbestos Issues in the Project Vicinity

As described above in the Setting section, asbestos is a naturally occurring mineral found in serpentinite rocks. There is no mapped serpentinite within Candlestick Point or locations to the west where proposed roadway improvements could be constructed. As shown in Figure III.L-1 in Section III.L, there is an area of serpentinite mapped in Parcel A, Parcel B, a portion of Parcel C, and a small area in Parcel G. Serpentinite may also underlie proposed roadway segment locations in that area. Previously disturbed serpentinite fragments have also been identified in fill material at HPS Phase II.

The 2000 Final EIR for HPS included a mitigation measure requiring various controls to be in place when working in areas with serpentinite, including complying with BAAQMD regulations.[338] Both to comply with BAAQMD requirements and local requirements in *San Francisco Health Code* Article 31, the Project Applicant of HPS Phase I prepared and implemented an Asbestos Dust Mitigation Plan (ADMP) and a DCP, respectively.

Community concern about the implementation of asbestos and dust control measures was heightened in Summer 2006 after the Phase I Project Applicant self-reported that its former asbestos air monitoring contractor had failed to ensure proper operation of the air monitoring stations for the first several months of grading activities and could not validate the sampling results. The SFDPH, the BAAQMD, USEPA, and independent experts from the University of California at San Francisco, along with the federal Centers for Disease Control (CDC) and the CDC Agency for Toxic Substances and Disease Registry (ATSDR) reviewed the potential health risks from construction dust containing asbestos in HPS Phase I.[339]. The reviews concluded that there was no significant health risk created by the grading activities at the Shipyard.[340] BAAQMD pursued enforcement action against the Project Applicant, who entered into a consent agreement to pay civil penalties for its air-monitoring contractor's failure to properly monitor and for its grading contractor's failure to fully implement components of the BAAQMD-approved asbestos dust-monitoring plan. The City also implemented a number of actions to enforce the requirements of its required DCP in order to minimize the potential for airborne asbestos during grading in HPS Phase I, including issuing several notices of violation requiring corrective action. Since then, the SFDPH has worked with the Project Applicant to improve the dust-monitoring program, and required preparation of a Revised DCP for HPS Phase I, which was implemented in February 2007. BAAQMD has also worked with the Project Applicant to improve the ADMP required by the state Airborne Asbestos Toxics Control Measure. Similarly, USEPA has worked with the Navy to ensure it is implementing asbestos dust control measures with respect to its remediation activities.

Types of Impacts and Control Measures for Naturally Occurring Asbestos

Naturally occurring asbestos is a potential health hazard. If large amounts are inhaled or swallowed over many years, it increases the risk that a person may develop cancer or other health problems. During grading in areas potentially containing naturally occurring asbestos, airborne asbestos could be released to the environment via air emissions that could present an inhalation or ingestion hazard to exposed populations.

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338 San Francisco Redevelopment Agency and Planning Department, Final Environmental Impact Report, Hunters Point Shipyard Reuse, February 8, 2000. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

339 Compiled from various City correspondence and factsheets dated June 1, 2007, October 9, 2007; California Department of Public Health correspondence dated September 10, 2007; United States Environmental Protection Agency correspondence dated February 18, 2009; and US Department of Health and Human Services correspondence dated September 20, 2007. This correspondence is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

340 Compiled from various City correspondence and factsheets dated June 1, 2007, October 9, 2007; California Department of Public Health correspondence dated September 10, 2007; and US Department of Health and Human Services correspondence dated September 20, 2007. This correspondence is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

These emissions could result from the initial disturbance of previously undisturbed serpentinite, and from handling and/or spreading previously disturbed serpentinite fragments. Construction workers would be the most susceptible to potential risks. However, existing and future on-site and adjacent off-site populations (residents, tenants, visitors, and workers) could also be exposed to airborne asbestos if proper precautions were not fully implemented.

Construction activities disturbing less than one acre of rock containing naturally occurring asbestos in HPS Phase II where serpentinite is present would be required under BAAQMD regulations to implement specific dust mitigation before construction begins, and each measure must be maintained throughout the duration of construction. For construction activities disturbing one acre or greater of rock containing naturally occurring asbestos, BAAQMD requires construction contractors to prepare an ADMP, specifying measures that would be taken to ensure that no visible dust crosses the property boundary during construction. The ADMP must be submitted to and approved by the BAAQMD prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust control measures throughout the construction Project.

Dust control measures would include: applying water during and after grading activities; covering stockpiles and truckloads; "track-out" prevention measures such as wheel washing stations at exits from the grading areas; placing final cover materials over any exposed naturally occurring asbestos at the end of the grading activities. In addition, depending on the location of the grading activity, it is possible that the BAAQMD may require air monitoring to determine if there is off-site migration of asbestos dust during construction activities, and may also require that activities temporarily shut down if the monitors detect specified levels of airborne asbestos.

In addition, the *San Francisco Health Code* Article 22B requires contractors to control dust (regardless of whether the construction activity is in an area with the potential for naturally occurring asbestos). Some of the dust control measures can include: controlling potential sources of emissions; implementing general dust control methods for traffic, grading, crushing, trenching and excavation, loading, stockpiles, foundation work, and post-construction stabilization of disturbed areas; demolition emissions control methods, monitoring and records, including corrective actions to control visible dust during active construction and times when no work is occurring. In addition, under the ordinance, projects over one half acre in size are required to submit a DCP to SFDPH for approval. Currently, a DCP for all areas of Parcel A HPS Phase I are required to be approved by SFDPH prior to grading pursuant to the current provisions of Article 31. Under Article 22B, SFDPH approval of DCPs are required at HPS Phase II prior to grading areas over one-half acre in size. When Article 31 is revised to encompass the remaining HPS parcels or an equivalent process is established then all areas of HPS Phase II will be required to submit a DCP. The DCPs may include installation of PM_{10} dust monitors and record keeping.

To reduce impacts related to asbestos exposure during construction activities, the following mitigation measure shall be implemented.

MM HZ-15 *Asbestos Dust Mitigation Plans and Dust Control Plans. Prior to obtaining a grading, excavation, site, building or other permit from the City that includes soil disturbance activities, the Project Applicant shall obtain approval of an Asbestos Dust Mitigation Plan (ADMP) from BAAQMD for areas over 1 acre that potentially contain naturally occurring asbestos and approval of a Dust Control Plan (DCP) from SFDPH for all areas at HPS Phase II and for areas over 0.5 acre at Candlestick Point. Compliance with the ADMP and DCP shall be required as a condition of the permit.*

The ADMP shall be submitted to and approved by the BAAQMD prior to the beginning of construction, and the Project Applicant must ensure the implementation of all specified dust control measures throughout the construction Project. The ADMP shall require compliance with the following specific control measures to the extent deemed necessary by the BAAQMD to meet its standard:

For construction activities disturbing less than one acre of rock containing naturally occurring asbestos, the following specific dust control measures must be implemented in accordance with the asbestos ATCM before construction begins and each measure must be maintained throughout the duration of the construction Project:

- *Limit construction vehicle speed at the work site to 15 miles per hour*
- *Sufficiently wet all ground surfaces prior to disturbance to prevent visible dust emissions from crossing the property line*
- *Keep all graded and excavated areas, around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times per shift daily with reclaimed water during construction to prevent visible dust emissions from crossing the property line. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour.*
- *Adequately wet all storage piles, treat with chemical dust suppressants, or cover piles when material is not being added to or removed from the pile*
- *Wash down all equipment before moving from the property onto a paved public road*
- *Clean all visible track out from the paved public road by street sweeping or a HEPA filter equipped vacuum device within 24 hours*

For construction activities disturbing greater than one acre of rock containing naturally occurring asbestos, construction contractors are required to prepare an ADMP specifying measures that will be taken to ensure that no visible dust crosses the property boundary during construction. The plan must specify the following measures, to the extent deemed necessary by the BAAQMD to meet its standard:

- *Prevent and control visible track out from the property onto adjacent paved roads. Sweep with reclaimed water at the end of each day if visible soil material is carried out from property.*
- *Ensure adequate wetting or covering of active storage piles*
- *Hydroseed or apply non-toxic soil stabilizers to disturbed surface areas and storage piles greater than ten cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil that will remain inactive for seven days or more*
- *Control traffic on on-site unpaved roads, parking lots, and staging areas—including a maximum vehicle speed of 15 miles per hour or less*
- *Provide as much water as necessary to control dust (without creating run-off) in any area of land clearing, earth movement, excavation, drillings, and other dust-generating activity.*
- *Control dust emissions from off-site transport of naturally occurring asbestos containing materials*
- *Stabilize disturbed areas following construction*

If required by the BAAQMD, air monitoring shall be implemented to monitor for off-site migration of asbestos dust during construction activities, and appropriate protocols shall be established and implemented for notification of nearby schools, property owners, and residents when monitoring results indicate asbestos levels that have exceeded the standards set forth in the plan.

The DCP shall be submitted to and approved by the SFDPH prior to the beginning of construction, and the Project Applicant must ensure the implementation of all specified dust control measures

throughout the construction Project. The DCP shall require compliance with the following specific mitigation measures to the extent deemed necessary by the SFDPH to achieve no visible dust at the property boundary:

- *Submission of a map to the Director of Health showing all sensitive receptors within 1,000 feet of the site.*
- *Keep all graded and excavated areas, areas around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times per shift daily with reclaimed water during construction to prevent visible dust emissions from crossing the property line. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour.*
- *Analysis of wind direction and placement of upwind and downwind particulate dust monitors.*
- *Record keeping for particulate monitoring results.*
- *Requirements for shutdown conditions based on wind, dust migration, or if dust is contained within the property boundary but not controlled after a specified number of minutes.*
- *Establishing a hotline for surrounding community members who may be potentially affected by Project-related dust. Contact person shall respond and take corrective action within 48 hours. Post publicly visible signs around the site with the hotline number as well as the phone number of the BAAQMD and make sure the numbers are given to adjacent residents, schools, and businesses.*
- *Limiting the area subject to construction activities at any one time.*
- *Installing dust curtains and windbreaks on windward and downwind sides of the property lines, as necessary. Windbreaks on windward side should have no more than 50% air porosity.*
- *Limiting the amount of soil in trucks hauling soil around the job site to the size of the truck bed and securing with a tarpaulin or ensuring the soil contains adequate moisture to minimize or prevent dust generation during transportation.*
- *Enforcing a 15 mph speed limit for vehicles entering and exiting construction areas.*
- *Sweeping affected streets with water sweepers at the end of the day.*
- *Installing and using wheel washers to clean truck tires.*
- *Halting all construction activities during periods of sustained strong winds, hourly average wind speeds of 25 miles per hour.*
- *Applying soil stabilization methods to inactive areas.*
- *Sweeping off adjacent streets to reduce particulate emissions.*
- *Hiring an independent third party to conduct inspections for visible dust and keeping records of those inspections.*
- *Minimizing the amount of excavated material or waste materials stored at the site.*
- *Prevent visible track out from the property onto adjacent paved roads. Sweep with reclaimed water at the end of each day if visible soil material is carried out from property.*

For all areas, this measure shall be implemented through Article 22B (areas over one half acre) or for HPS Phase II through a requirement in the potential additions to Article 31 imposing requirements to parcels other than Parcel A or through an equivalent process established by the City or Agency.

Although the ADMP and DCP requirements described above would be required independent of this EIR, to ensure redundant protection, implementation of mitigation measure MM HZ-15 would require the preparation of an ADMP approved by BAAQMD and a DCP approved by SFDPH before commencing

grading activities and any other activity that could disturb potential sources of naturally-occurring asbestos (including Bay Fill areas with the potential to contain previously-disturbed serpentinite fragments). The mitigation measure would also require implementation of all the mitigation measures, and compliance with all the requirements, set forth in the ADMP and DCP. Implementation of this mitigation measure would reduce impacts related to naturally occurring asbestos exposure during construction activities to a less-than-significant level.

Impact HZ-16: Exposure to Hazardous Materials in Building and Structures

Impact of Candlestick Point

Impact HZ-16a **Construction at Candlestick Point would not result in a health hazard to construction workers, the public, or the environment as a result of the demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury. (Less than Significant) *[Criterion K.b]***

The Project would include demolition of existing structures at Candlestick Point. Hazardous building materials are likely to be present in older structures including Candlestick Park stadium completed in 1960. Building materials could include asbestos-containing materials, lead-based paint, PCBs, and fluorescent lights containing mercury vapors. Demolition or renovation of existing structures could result in potential exposure of workers or the community to hazardous building materials during construction, without proper abatement procedures, and future building occupants could be exposed if hazardous building materials are left in place and not properly contained. Soil around a structure could also become contaminated by hazardous building materials if these materials were inadvertently released to the environment.

Inadvertent releases of friable asbestos, lead, or PCBs contained in materials or items removed during demolition activities could expose construction workers, occupants, or visitors to these hazardous materials, which could result in various adverse health effects if exposures were of sufficient quantity and length. In addition, some of the debris may meet criteria for hazardous waste and must be disposed of properly. To reduce potential human exposures to acceptable levels and to protect the environment, the Project would comply with several regulations and guidelines, discussed above, pertaining to abatement of and protection from exposure to asbestos and lead, as discussed under Section III.K.3, as appropriate (e.g., Cal/OSHA has regulations on worker exposure to both chemicals). Items containing PCBs, mercury, or other hazardous substances that are intended for disposal must be managed as hazardous waste and must be handled in accordance with OSHA worker protection requirements.

Implementation of applicable regulations and standards would ensure that potential health and environmental hazards associated with asbestos, lead, or PCBs in buildings and structures to be demolished would be minimized to the extent required by law. Therefore, impacts would be less than significant. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact HZ-16b **Construction at HPS Phase II would not result in a health hazard to construction workers, the public, or the environment as a result of the demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury. (Less than Significant) *[Criterion K.b]***

Existing buildings in HPS Phase II would be demolished to accommodate new development. The potential hazards related to chemical contaminants in structures and facilities, and how those hazards would be managed to minimize the risk to human health and the environment would be as described for Candlestick Point. Further, any actions the Navy undertakes prior to or during development of the proposed land uses in HPS Phase II to abate hazardous building materials would also be subject to Navy procedures and reporting. Department of Defense policy states that all property containing asbestos will be conveyed, leased, or otherwise disposed of as-is through the BRAC process. Department of Defense policy regarding lead-based paint in existing residential areas is to manage it in a manner protective of human health and the environment, and to comply with all applicable laws and regulations. Pursuant to Department of Defense, Navy and USEPA policy, these deeds will contain restrictions that mandate compliance with certain federal policies and laws related to handling ACBM and lead.

The existing regulatory environmental framework and approval process would avoid potential hazards from demolition of buildings. Impacts would be less than significant. No mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-16 **Construction activities associated with the Project would not result in a health hazard to construction workers, the public, or the environment as a result of the demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury. (Less than Significant) *[Criterion K.b]***

The Project would include demolition of existing structures at Candlestick Point and HPS Phase II. Building materials could include asbestos-containing materials, lead-based paint, PCBs, and fluorescent lights containing mercury vapors. Demolition or renovation of existing structures could result in potential exposure of workers or the community to hazardous building materials during construction, without proper abatement procedures, and future building occupants could be exposed if hazardous building materials are left in place and not properly contained. Implementation of applicable regulations and standards would ensure that potential health and environmental hazards associated with asbestos, lead, or PCBs in buildings and structures to be demolished would be minimized to the extent required by law. The existing regulatory environmental framework and approval process would avoid potential hazards from demolition. With the implementation of existing regulations, impacts would be less than significant. No mitigation is required.

Impact HZ-17: Worker Safety—Exposure to Hazardous Materials

Impact of Candlestick Point

Impact HZ-17a **Construction at Candlestick Point would not expose construction workers to unacceptable levels of hazardous materials in soil or groundwater in a manner which would present a human health risk. (Less than Significant with Mitigation) *[Criterion K.b]***

Potential worker health and safety impacts associated with site investigations, site remediation, underground storage tank removal, excavation, dewatering, and construction of improvements at locations in Candlestick Point could occur where these areas have been affected by hazardous materials. Such impacts would be minimized by implementing legally required health and safety precautions. For hazardous waste workers, federal and Cal/OSHA regulations mandate an initial training course and subsequent annual training. Site-specific training may also be required for some workers.

Although worker safety regulations would require the preparation and implementation of a site-specific HASP independent of this EIR, mitigation measure MM HZ-2a.2 would impose the requirement to prepare such a plan in compliance with applicable federal and state OSHA requirements and other applicable laws. The plan would include identification of chemicals of concern, potential hazards, personal protection clothing and devices, and emergency response procedures. Implementation of this mitigation measure would reduce impacts to less-than-significant levels.

Impact of Hunters Point Shipyard Phase II

Impact HZ-17b **Construction at HPS Phase II would not expose construction workers to unacceptable levels of hazardous materials in soil, sediment, or groundwater in a manner which would present a human health risk. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Potential worker health and safety impacts from exposure to hazardous materials could occur during excavation, dewatering, construction of improvements, site investigations, site remediation, and underground storage tank removal at HPS Phase II. The potential for these impacts to occur would be minimized by implementing legally required health and safety precautions. For workers at sites where they would encounter hazardous waste, federal and Cal/OSHA regulations mandate an initial training course and subsequent annual training. Site-specific training may also be required for some workers.

Although existing worker safety regulations would require preparation and implementation of a HASP independent of this EIR and work would be conducted in accordance with RMPs, to ensure compliance with these requirements, mitigation measure MM HZ-2a.2 would require a permit applicant to prepare, submit to SFDPH and implement a site-specific HASP for any affected location in compliance with applicable federal and state OSHA requirements and other applicable laws to minimize impacts to public health and the environment. The plan would include identification of chemicals of concern, potential hazards, personal protective equipment and devices, and emergency response procedures. Implementation of this mitigation measure would reduce impacts to less-than-significant levels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-17 **Construction activities associated with the Project would not expose construction workers to unacceptable levels of hazardous materials in soil, sediment, or groundwater in a manner which would present a human health risk. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Potential worker health and safety impacts associated with site investigations, site remediation, underground storage tank removal, excavation, dewatering, and construction of improvements at locations in the Project site could occur where these areas have been affected by hazardous materials. Although worker safety regulations would require the preparation and implementation of a site-specific HASP independent of this EIR and work would be conducted in accordance with RMPs, mitigation measure MM HZ-2a.2 would impose the requirement to prepare such a plan in compliance with applicable federal and Cal/OSHA requirements and other applicable laws. The plan would include identification of chemicals of concern, potential hazards, personal protection clothing and devices, and emergency response procedures. Implementation of this mitigation measure would reduce impacts to less-than-significant levels.

Impact HZ-18: Construction Activities with Potential to Generate Hazardous Air Emissions within One-Quarter Mile of a School

Impact of Candlestick Point

Impact HZ-18a **Construction at Candlestick Point would not result in a human health risk involving the disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, or possible disturbance of contaminated soils or groundwater within one-quarter mile of an existing school. (Less than Significant with Mitigation) *[Criterion K.c]***

The Bret Harte Elementary School is immediately west of Alice Griffith Public Housing site on Gilman Street and northwest of the proposed Candlestick Point North district (refer to Figure III.O-2 [Southeast San Francisco Schools and Libraries]).

As described under Impact HZ-17a, hazardous building materials are likely to be present in older structures within the Alice Griffith public housing site and could include asbestos-containing materials, lead-based paint, PCBs, and fluorescent lights containing mercury vapors. Demolition or renovation of existing structures could result in potential exposure of students, teachers, staff, and visitors at the school to hazardous building materials during construction, without proper abatement procedures. Soil around a structure could also become contaminated by hazardous building materials if these materials were released to the environment. To reduce the potential for the school site to be exposed to hazardous air emissions, the Project would comply with regulations and guidelines pertaining to abatement of and protection from exposure to asbestos and lead, as discussed under Section III.K.3 (Regulatory Framework) would be complied with, as appropriate. Implementation of applicable regulations and standards would ensure that hazardous air emissions from structures to be demolished would be minimized. Therefore, impacts would be less than significant, and no additional mitigation is required.

Some locations in Candlestick Point are known to contain low levels of contaminants in soil from historic uses; however, there are currently no sites within Candlestick Point requiring remediation. As explained in Impact AQ-3a, Impact AQ-3b, and Impact AQ-3 in Section III.H carcinogenic and noncarcinogenic health risks posed by contaminants bound to soil dust during construction activities associated with development of Candlestick Point would be below established thresholds. Therefore, the potential for contaminated dust to become airborne during construction that could cause hazardous emissions within is minimal. Nonetheless, if a contaminated site is identified during construction and testing under Article 22A, mitigation measure MM HZ-1a identified the location as requiring risk management, and if that location is within one-quarter mile of the school, the required Unknown Contaminant Contingency Plan (mitigation measure MM HZ-2a.1) would specify the necessary dust control requirements, and the Health and Safety Plan (mitigation measure MM HZ-2.a.2) would specify procedures to be protective of workers, which would also help minimize risks to off-site locations. This impact would be reduced to a less-than-significant level through implementation of Article 22A, where applicable, or mitigation measures MM HZ-1a, MM HZ-2a.1, and MM HZ-2a.2.

There are no rock formations containing naturally occurring asbestos in Candlestick Point, but there is fill material present that could contain rock fragments derived from locations elsewhere in the City in which asbestos could be present. This impact would be reduced to a less-than-significant level through implementation of mitigation measure MM HZ-15. Under MM HZ-15, construction activities disturbing less than one acre of rock containing naturally occurring asbestos would be required under BAAQMD regulations to implement specific dust mitigation before construction begins, and each measure must be maintained throughout the duration of construction. For construction activities disturbing one acre or greater of rock containing naturally occurring asbestos, BAAQMD requires construction contractors to prepare an ADMP, specifying measures that would be taken to ensure that no visible dust crosses the property boundary during construction. The ADMP must be submitted to and approved by the BAAQMD prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust control measures throughout construction.

The school is more than one-quarter mile from portions of HPS Phase II, where there is known naturally occurring asbestos that could be disturbed and could be a source of airborne emissions (see below). However, mitigation measure MM HZ-15 is also required for construction in HPS Phase II, which would reduce impacts associated with development activities in HPS Phase II that, although unlikely, could affect locations in Candlestick Point.

Impact of Hunters Point Shipyard Phase II

Impact HZ-18b **Construction at HPS Phase II would not result in a human health risk involving the disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, or possible disturbance of contaminated soils or groundwater within one-quarter mile of an existing school. (Less than Significant with Mitigation)** ***[Criterion K.c]***

Muhammad University of Islam, a year-round elementary school, is located adjacent to the Hillside portion of HPS Phase I development. No schools are proposed in HPS Phase II.

As shown in Figure III.L-1, there is an area of serpentinite mapped in Parcel A, Parcel B, a portion of Parcel C, and a small area in Parcel G. Serpentinite may also underlie proposed roadway segment locations in that area. Previously disturbed serpentinite fragments have also been identified in fill material at HPS Phase II. Therefore, construction within HPS Phase II would involve disturbance of naturally occurring asbestos, which could be a source of hazardous air emissions within one-quarter mile of a school.

An enhanced dust control program would be in place in accordance with the City's Dust Ordinance, which would be implemented under mitigation measure MM HZ-15. In addition, implementation of mitigation measures MM HZ-2a.1 and MM HZ-2a.2 for development in HPS Phase II would also help control dust emissions at HPS Phase II boundary, which would ensure airborne asbestos emissions do not present a health risk to the off-site school.

Demolition or renovation of existing structures in HPS Phase II could result in potential exposure of students, teachers, staff, and visitors at MUI to hazardous building materials during construction, without proper abatement procedures. Soil around a structure could also become contaminated by hazardous building materials if these materials were released to the environment. The Navy must adhere to regulations and guidelines pertaining to abatement of and protection from exposure to asbestos and lead, as discussed in Impact HZ-17b. Implementation of applicable regulations and standards would reduce impacts to a less-than-significant level. This would ensure that hazardous air emissions from structures to be demolished that could affect the school site would be minimized.

Construction activities in HPS Phase II would involve extensive construction to accommodate new development within that area. Site preparation activities could disturb known or previously unidentified contaminants in soil or groundwater that could be a source of hazardous emissions within one-quarter mile of MUI. However, as explained in Impact AQ-3a, Impact AQ-3b, and Impact AQ-3 in Section III.H (Air Quality), carcinogenic and noncarcinogenic health risks posed by contaminants bound to soil dust during construction activities associated with development of HPS Phase II would be below established thresholds. Nonetheless, because there would be hazardous emissions, this impact would be reduced to a less-than-significant level through implementation of mitigation measures MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, and MM HZ-15, as explained below.

For construction activities at HPS Phase II, mitigation measure MM HZ-1b would require SFDPH to verify, before all development activities at HPS Phase II that disturb soil or groundwater occur, that the activities would be done in compliance with all applicable restrictions pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOST, FOSET or FOSL, or License Agreement, including restrictions imposed in deeds, covenants, leases, and LIFOCs, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans. Implementation of those measures would ensure that potential adverse effects on the school site from exposure to known subsurface hazards from construction activities would be reduced to a less-than-significant level.

The disturbance of soil or groundwater containing previously unidentified contamination could also be a source of emissions that could affect the school site. If a previously unknown contaminated site is identified during construction, and if that location is within one-quarter mile of the school, the required Unknown Contaminant Contingency Plan (mitigation measure MM HZ-2a.1) would specify the necessary requirements and the dust control requirements required under a DCP (mitigation measure MM HZ-15)

and the Health and Safety Plan (mitigation measure MM HZ-2.a.2) would specify procedures to be protective of workers, which would also help minimize risks to off-site locations. This impact would be reduced to a less-than-significant level through implementation of mitigation measures MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, and MM HZ-15.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-18 **Construction activities associated with the Project would not result in a human health risk involving the disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, or possible disturbance of contaminated soils or groundwater within one-quarter mile of an existing school. (Less than Significant with Mitigation) *[Criterion K.c]***

Construction within the Project site would involve disturbance of naturally occurring asbestos, demolition of buildings that could contain hazardous substances in building materials, and possible disturbance of contaminated soils or groundwater, each of which could be a source of hazardous air emissions within one-quarter mile of a school. The Bret Harte Elementary School is immediately west of Alice Griffith public housing site on Gilman Street and northwest of the proposed Candlestick Point North district. The Muhammad University of Islam is within one-quarter mile of HPS Phase II.

The results of a health risk assessment that evaluated the potential for contaminants bound to soil disturbed during construction are presented in Impact AQ-3a, Impact AQ-3b, and Impact AQ-3. The results indicate that carcinogenic and noncarcinogenic health risks posed by contaminants bound to soil dust during construction activities would be below established thresholds. Nonetheless, because hazardous air emissions could occur and could affect school sites, this impact at Candlestick Point would be reduced to a less-than-significant level through implementation of Article 22A, where applicable, or mitigation measures MM HZ-1a and MM HZ-2a.1. Implementation of mitigation measure MM HZ-1b would reduce impacts for HPS Phase II development. In addition, implementation of mitigation measures MM HZ-2a.1, MM HZ-2a.2, and MM HZ-15 would also help control dust emissions at the Project site boundary, which would ensure airborne asbestos emissions do not present a health risk off site.

Impact HZ-19: Potential Projectwide Impacts during Project Construction

Impact HZ-19 **Simultaneous construction activities at the Project site would not pose a human health risk from the release of contaminants from historic uses or fill. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

Construction impacts associated with the potential to encounter hazardous materials or hazardous conditions during construction anywhere in the Project site, whether at Candlestick Point or HPS Phase II would for the most part be site specific and not additive because development activities at one site would be localized and would not combine with activities at another site to create a greater, combined effect. In addition, development would be sequenced, so only portions of each area would be expected to be under development at the same time. For example, in the early stages of development, it is anticipated that on Candlestick Point, construction of replacement units for current residents of Alice Griffith public housing would occur first. On HPS Phase II, stadium construction is expected to begin first, followed by development of the mixed-use area planned in the Parcel B area. The Project would be sequenced as

- described in Chapter II and is anticipated to be complete by 2031. Some off-site roadway improvements would be done as part of the Project, but these would be of a limited nature, largely involving streetscape improvements and would be developed over time. On Candlestick Point and HPS Phase II, the development of both areas is expected to continue through approximately 2031, with only portions of each area under development at any one time.

One activity that could affect areas outside of the immediate work area is movement of soil from one location to another. The possible export of soil from off of the immediate construction site is discussed under Impact HZ-3a and Impact HZ-3b, and in Impact HZ-6a and Impact HZ-6b. As discussed in these sections, at Candlestick Point soil is expected to be reused within those areas or, if not hazardous waste and otherwise allowed under the environmental remediation program, to be reused at HPS Phase II. Soil excavated from Candlestick Point could be transported to and reused at HPS Phase II only if (1) the soil were not characterized as hazardous waste under state or federal hazardous waste management regulations; and (2) the soil were to comply with any applicable soil import requirements related to what type of soil can be placed into particular areas of the site, imposed as part of the remediation program overseen by the FFA Signatories and/or by a RMP and/or by local ordinance. Excavated soil removed at HPS Phase II may be used as fill elsewhere at HPS Phase II, to the extent permissible under the restrictions imposed through ICs and transfer documents (mitigation measure MM HZ-1b) and Navy-approved workplans (mitigation measure MM HZ-9). If nonhazardous soil is moved off site, it would be subject to laws concerning nonhazardous soil transport. Most soil is expected to remain in the Project site. However, if soil that is hazardous waste must be disposed of off site, the hauling and disposal would be subject to a number of existing environmental laws regulating these activities. If soils containing hazardous materials are allowed to be moved within a site, any movement would be subject to a variety of federal, state, and local environmental regulatory controls as detailed previously. Mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-9, and MM HZ-15 would ensure that before development occurs within the Project site and vicinity that appropriate soil management plans and DCPs have been developed to address both soil movement and reuse within the Project site and off-site reuse and disposal. Under the mitigation measures, compliance with the requirements of these plans is a condition of development. With the implementation of these mitigation measures, impacts from soil movements within and outside of the entire Project site would be reduced to a less-than-significant level.

Impact HZ-20: Routine Use, Storage, Transportation, and Disposal of Hazardous Materials

Impact HZ-20 **Construction activities associated with the Project would not result in adverse impacts to construction workers, visitors, or the environment from the routine use, storage, transportation, and disposal of hazardous materials. (Less than Significant) *[Criterion K.a]***

Construction activities related to the proposed project would require the use and transportation of hazardous materials (e.g., fuels, cement products, lubricants, paints, adhesives, and solvents). In addition, construction vehicles would be used on-site that could accidentally release hazardous materials such as oils, grease or fuels. These hazardous materials and vehicles would remain on the Project site during the period of construction activities. Accidental releases of hazardous materials during demolition and construction activities could impact soil and/or groundwater quality, which could result in adverse health effects to construction workers,

the public, and the environment. However, the contractor's compliance with requirements related to DPH's HMUPA certificate of storage for hazardous materials during construction would reduce these potential impacts related to inadvertent release of hazardous materials to less-than-significant levels. In addition, the Project contractors would be required to comply with the requirements of Article 4.1 of the San Francisco Public Works Code, which requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) (described in the Hydrology and Water Quality section), which would further reduce potential impacts related to inadvertent release of hazardous materials during construction.

Compliance with the SWPPP and HMUPA requirements would ensure that potential releases from the transport and use or disposal of hazardous materials during project construction activities would be reduced to a less-than-significant level. No mitigation is required.

Operational Impacts

After Project development and occupancy, operation of infrastructure and land uses could involve the use of products that could contain hazardous materials. In addition, maintenance activities could disturb site soils that contain hazardous materials.

Impact HZ-21: Routine Maintenance of Properties

Impact of Candlestick Point

Impact HZ-21a **Implementation of the Project at Candlestick Point would not result in adverse impacts to residents, visitors, or the environment from periodic maintenance requiring excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs. (Less than Significant with Mitigation)** ***[Criteria K.b and K.d]***

After Project occupancy, it is likely that the City or others would from time to time need to excavate site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs. Prior to occupancy, sites for which soil remediation would be necessary would either be remediated by excavation, in-situ treatment, or capping with impervious surfaces or pavement. Deed restrictions and covenants would indicate the depths to which clean fill has been placed. Therefore, contact with unremediated soil by construction workers, or inhalation of soils by workers or the public, would not be expected to pose a substantial human health risk. However, the restrictive covenants and any incorporated implementation documents would dictate the circumstances under which regulatory oversight agencies would allow work in unremediated soil and the conditions that would be attached to such work. In addition, implementation of mitigation measures MM HZ-1a, MM HZ-2a.1, and MM HZ-2a.2 would ensure risks to human health and the environment would be reduced to a less-than-significant level.

Impact of Hunters Point Shipyard Phase II

Impact HZ-21b **Implementation of the Project at HPS Phase II would not result in adverse impacts to residents, visitors, or the environment from periodic maintenance requiring excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

During occupancy, it is likely that the City or others would from time to time need to excavate site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs. Prior to occupancy, sites for which soil remediation would be necessary would either be remediated by excavation, in-situ treatment, or capping with impervious surfaces or pavement. Deed restrictions and covenants would indicate the depths to which clean fill has been placed. Therefore, contact with unremediated soil by construction workers, or inhalation of soils by workers or the public, is not expected to pose a substantial human health risk. However, the restrictive covenants and any incorporated implementation documents would dictate the circumstances under which regulatory oversight agencies would allow work in unremediated soil and the conditions that would be attached to such work. This would ensure risks to human populations are minimized.

The proposed 300-slip marina along the east shoreline of HPS Phase II, north of the Gun Mole Pier would require creation of a 34-acre basin. The current water depths of the proposed basin are adequate for recreation craft. The basins would not require initial dredging, but maintenance dredging would be required in the future. The proposed marina is in Parcel F, adjacent to Parcel C; however, this area is not identified as an investigation/remediation subarea in which sediments are known to be contaminated

Implementation of mitigation measures MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-9, and MM HZ-12 would require compliance with restrictions set forth in ICs, transfer documents, and the AOC and requiring the preparation and implementation of a unknown contaminant contingency plan and HASP would ensure that impacts during occupancy from these routine maintenance activities would be reduced to a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HZ-21 **Implementation of the Project would not result in adverse impacts to residents, visitors, or the environment from periodic maintenance requiring excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs. (Less than Significant with Mitigation) *[Criteria K.b and K.d]***

During occupancy, it is likely that the City or others would from time to time need to excavate site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs. Prior to occupancy, sites for which soil remediation would be necessary would either be remediated by excavation, in-situ treatment, or capping with impervious surfaces or pavement. Deed restrictions and covenants would indicate the depths to which clean fill has been placed. Therefore, contact with unremediated soil by construction workers, or inhalation of soils by workers or the public, is not expected to pose a substantial human health risk. However, implementation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-9, and MM HZ-12 would require compliance existing regulations and restrictions set forth in ICs, transfer documents, and the AOC and requiring the preparation and implementation of a

soil management contingency plan and HASP would ensure that impacts during occupancy from these routine maintenance activities would be reduced to a less-than-significant level.

Impact HZ-22: Routine Use, Storage, Transport, or Disposal of Hazardous Materials

Impact HZ-22 Implementation of the Project would not result in a significant impact involving the routine use, storage, transportation, and disposal of hazardous materials. (Less than Significant) *[Criterion K.a]*

Nearly all Project uses would involve the presence of hazardous materials (or products containing hazardous materials) at varying levels, and this would represent an increase in hazardous materials use compared to existing conditions. It would also increase the number people who could be exposed to potential health and safety risks associated with routine use. The following summarizes the general types of hazardous materials that would be expected in the Project, based on the proposed land use designations.

Households and certain businesses (e.g., retail stores, restaurants, hotel, entertainment venues, artists studios, office-based commercial businesses) would use relatively small quantities of hazardous materials. Typical products containing hazardous materials would consist mostly of household-type cleaning products as well as maintenance products (e.g., paints, solvents, cleaning products), fuels and other petroleum products, refrigerants associated with building mechanical and heating, ventilation and air conditioning (HVAC) systems, and some media used by artists. Grounds and landscape maintenance within the development area could also use a wide variety of commercial products formulated with hazardous materials, including fuels, cleaners and degreasers, solvents, paints, lubricants, adhesives, sealers, and pesticides/herbicides. Under the proposed stadium option, a similar range of maintenance products containing hazardous materials would routinely be used.

If cooling towers are used as part of stadium operations in conjunction with an air conditioning system, they may involve the use of a few chemicals to inhibit rust or corrosion in the storage units. However, the types and amounts would be limited, and their use would be subject to established laws and regulations.

The proposed R&D land uses are likely to include businesses and facilities supporting "green" technologies, in which some laboratory-based activities would be reasonably anticipated. Some R&D operations could involve "dry" laboratories (or operations), where relatively small or negligible quantities of hazardous materials would be used because the space would typically be used for office-based research, software development, and so on. In those cases, the types of hazardous materials would be limited to such items as cleaning and maintenance materials, and office products such as adhesives and glues. "Wet" research lab functions, on the other hand, could involve a broad spectrum of activities involving hazardous materials, which would be used in controlled environments (e.g., fume hoods and special rooms). The types and volumes of hazardous materials that would be used in wet research is difficult to predict because the specific businesses that could operate R&D facilities are not known, and because hazardous materials use is subject to continuous change as technologies evolve and as businesses change. However, it is reasonably foreseeable that hazardous materials would be used routinely. R&D businesses would be subject to more intense regulation and oversight than businesses (and households) that handle smaller quantities of more common materials. Employees performing wet laboratory work would be required (by law) to receive specific training, which is intended to protect the workplace as well as to minimize the potential

for spills or inadvertent releases that could adversely affect the environment through air emissions or releases to sewers, storm drains, or land.

Additionally, the types of hazardous materials that are typically used at marinas include fuel, oil, and maintenance products for boats. Therefore, underground fuel storage tanks and waste oil drums could be present at the Project site during operation of the marina.

If medical-related establishments (i.e., doctor/dentist offices, medical laboratories, or pharmacies) operate within the commercial areas of the Project site, small amounts of laboratory-type chemicals, compressed gases, pharmaceuticals, and radiological materials would be used and stored. Medical, biohazardous, and low-level radioactive wastes would be produced from these activities.

Wherever hazardous materials are used or stored, there is the potential for human exposure, and, under certain conditions, potential releases to the environment. In each situation, the potential hazards and the risks they would pose to people or the environment would depend on what materials would be used, where the materials would be used and stored, how they would be used, and who would use them. The routes through which these individuals could be exposed include inhalation, ingestion, dermal (skin and eye) contact, and other accidents.

For the Project, there are no large-scale manufacturing or processing facilities proposed that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. For this reason, the individuals most at risk would be employees or others in the immediate vicinity of the hazardous materials, rather than residents or visitors. For the most part, the health and safety procedures that protect workers and other individuals in the immediate vicinity of hazardous materials would also protect the adjacent community and environment. The pathways through which the community or the environment (e.g., local air quality and biota) could be exposed to hazardous materials include air emissions, transport of hazardous materials to or from the site, waste disposal, human contact, and accidents. However, the only primary potential pathway for public exposure to hazardous materials would be airborne emissions under normal operations or upset conditions, such as those caused by diesel particular matter, toxic air contaminants, or traffic-related $PM_{2.5}$ emissions. These impacts are addressed in Section III.H in Impact AQ-2a, Impact AQ-2b, Impact AQ-2c, Impact AQ-2, Impact AQ-6, and Impact AQ-7.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. The precise increase in the amount of hazardous materials transported to or from the Project site as a result of implementation of the Project cannot be definitively predicted due to the pending selection of tenants for the future retail-commercial stores. But it is reasonable to assume with the addition of new land uses involving hazardous materials use, there would be an increase in transportation relative to current conditions. Such transportation would be provided by vendors licensed for such transport, and appropriate documentation for all hazardous materials and wastes would be required for compliance with the existing hazardous materials regulations.

As indicated in the Regulatory Framework, there is an established, comprehensive framework independent of the CEQA process, which is intended to reduce the risks associated with hazardous materials use (and generation of hazardous waste). The San Francisco Department of Public Health (DPH), Hazardous Materials Unified Program Agency (HMUPA) has been granted authority by the State to enforce most regulations pertaining to hazardous materials in the City, including permitting for hazardous materials storage, underground storage tanks, and hazardous waste generation under the DPH Certificate of Registration Program.

Facilities where hazardous materials would be used during Project operation would be constructed in accordance with current laws and regulations, which require storage that minimizes exposure to people or the environment, and the potential for inadvertent releases. In addition, these materials would be labeled to inform users of potential risks and to instruct them in appropriate storage, handling, and disposal procedures. Employers are required by law (Cal/OSHA) to ensure employee safety by properly identifying hazardous materials and adequately training workers. The use of hazardous materials and generation of wastes would continue to be regulated under the authority of the DPH HMUPA under a compliance certificate, with additional oversight by other agencies (RHB, CDHS). Transporters of hazardous materials and wastes are required to comply with federal laws and regulations that are monitored and enforced by the CHP.

SFDPH HMUPA would continue to conduct periodic inspections to ensure that hazardous materials and wastes are being used and stored properly. For these reasons, hazardous materials uses and waste generation for project operations would not pose a substantial public health or safety hazard to the surrounding area. Impacts from the routine transport, use or disposal of hazardous materials (including radiological, hazardous and medical wastes) from operation of the proposed project would therefore be less than significant. No mitigation is required.

Impact HZ-23: Exposure to Hazardous Materials Via Upset and Accident Conditions

Impact HZ-23 **Implementation of the Project would not pose a human health risk and/or result in an adverse effect on the environment from reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Less than Significant) *[Criterion K.a]***

Potential hazards from routine use, storage, transport, or disposal of hazardous materials are addressed in Impact HZ-22, above. Therefore, the following discussion focuses on risks to the public from exposure to accidental releases of hazardous materials through reasonably foreseeable upset and accident conditions during operation of the Project.

With increased routine use of hazardous materials compared to existing conditions, exposure of future occupants, visitors, and employees to hazardous materials could occur by improper handling or use of hazardous materials or hazardous wastes during operation of the Project, particularly by untrained personnel, environmentally unsound disposal methods, or fire, explosion, or other emergencies, all of which could result in adverse health effects. Accidents involving the transportation of hazardous materials to, from, or within the Project could also occur.

In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. No industrial manufacturing or processing activities using large amounts of hazardous materials or acutely hazardous materials, which typically pose a greater accident or upset risk, are proposed. Major hazardous materials accidents associated with retail-commercial uses, including restaurants, theaters, and stores are extremely infrequent. Moreover, as described in Impact HZ-22, releases, if any, present a greater, although manageable, risk to immediately exposed individuals rather than the population at large. The San Francisco Fire Department (SFFD) responds to hazardous materials incidents within the City, and additional emergency response capabilities are not anticipated to be necessary to respond to the potential incremental increase in the number of incidents that could result from operation of the Project.

Potential impacts from upset and accident conditions involving the release of hazardous materials and wastes would also be less than significant, because the project would be required to comply with DPH requirements for hazardous materials and waste management, which are described in Impact HZ-22, above. This includes preparation of required emergency response plans for facilities subject to HMBP requirements and permitting for hazardous materials storage, underground storage tanks, and hazardous waste generation under the DPH Certificate of Registration Program.

As described in the Section III.K.3 and as summarized in Impact HZ-22, the transportation of hazardous materials is required to comply with federal and state laws and regulations. These regulations identify proper labeling and packaging, transfer, and documentation requirements. State law prescribes requirements for through-transport of hazardous materials on roadways under state control.

There is a comprehensive and ongoing hazardous materials emergency response program in the city. San Francisco has an Emergency Response Plan (ERP) that was developed to ensure allocation of and coordination of resources in the event of an emergency in the City and County of San Francisco. The ERP describes at a high level what the City's actions will be during an emergency response.[341] A separate Hazard Mitigation Plan (HMP) assesses risks posed by natural and human-caused hazards and set forth a mitigation strategy for reducing the City's risks.[342] The specific departmental responsibilities for responding to hazardous materials incidents in the City are outlined in the "Emergency Support Function #10 Oil and Hazardous Materials Response Annex" to the ERP.[343] San Francisco Fire Department (SFFD) is the first responder in responding to hazardous materials emergencies for the city and county. This is less than significant. No mitigation is required.

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[341] City and County of San Francisco, Emergency Response Plan, an Element of the CCSF Emergency Management Program, April 2008. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[342] City and County of San Francisco, Emergency Response Plan, Emergency Support Function #10 Oil and Hazardous Materials Response Annex. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[343] City and County of San Francisco, Emergency Response Plan, an Element of the CCSF Emergency Management Program, April 2008. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Impact HZ-24: Facilities with Hazardous Air Emissions within One-Quarter Mile of a School

Impact HZ-24 **Areas designated for research and development uses within HPS Phase II would not pose a human health risk as a result of hazardous air emissions within one-quarter mile of a school. (Less than Significant with Mitigation)** ***[Criterion K.c]***

Impact AQ-6 in Section III.H, evaluates toxic air contaminant (TAC) emissions associated with R&D uses in HPS Phase II. The impact is summarized here as it relates to proximity to schools within one-quarter mile of the HPS Phase II site (Muhammad University of Islam). The reader is referred to Section III.I for detailed information about assumptions and analysis results.

For the purposes of the analysis in Impact AQ-6, a conservative scenario of potential TAC emissions from each potential future source of TACs was modeled to estimate the potential health impact on residential receptor locations within HPS Phase II. It was assumed that each allowable location for TAC emissions would emit chemicals at the maximum allowable rate, when, in fact, the TAC emissions at some of these locations within the R&D area would be below the maximum rate (for example, office building emissions for TAC would be zero or close to zero). Receptors evaluated in the analysis included (1) receptors on the boundary of each individual TAC emission source spaced 20 meters apart along the boundary ("boundary receptors") and (2) grid receptors placed over surrounding receptor locations, both on site (i.e., within the Project boundaries) and off site, spaced at 50 meters ("grid receptors").

The health risk assessment for R&D uses estimated the excess lifetime cancer risk and chronic noncancer hazard index resulting from the combined TAC emissions from the R&D areas at any surrounding receptor location within HPS Phase II. The estimated excess lifetime cancer risks and hazard indices within areas designated for residential use were found not to exceed the BAAQMD's current significance thresholds for carcinogenic and noncarcinogenic health risks with the Project.

Because BAAQMD's significance thresholds would not be exceeded for the most sensitive use within the Project (residential), the estimated numerical risk values would be further reduced, and thresholds would not be exceeded for off-site locations as well. In addition, mitigation measures MM AQ-6.1 and MM AQ-6.2 identify steps that would be taken to ensure numerical thresholds are not exceeded. Impacts would be less than significant for the MUI school site.

There are no potential sources of operational hazardous air emissions within Candlestick Point that could affect the Bret Harte Elementary School.

Impact HZ-25: Conflict with Airport Land Use Plans

Impact HZ-25 **The Project site is not within the San Francisco Airport Land Use Policy Plan and the Project would not result in a safety hazard for people residing or working in the Project site. (No Impact). *[Criterion K.e]***

The Project site is approximately six miles north of the San Francisco International Airport. The Project site is not located within any of the "restricted zones."[344] There would be no impact related to safety hazards for people residing or working in the Project site. No mitigation is required.

Impact HZ-26: Proximity to Private Air Strips

Impact HZ-26 **Implementation of the Project would not occur within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working in the Project site. (No Impact). *[Criterion K.f]***

No private airstrips exist in the Project site or vicinity. There would be no impact related to safety hazards for people residing or working in the Project site. No mitigation is required.

Impact HZ-27: Fire Hazards, Emergency Response, and Evacuation Plans

Impact HZ-27 **Implementation of the Project would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans. (Less than Significant) *[Criteria K.g and K.h]***

Development of the Project would increase numbers of residents and employees in the Project site who, in turn, could result in congestion in the event of an emergency evacuation. San Francisco ensures fire safety primarily through provisions of the *San Francisco Building Code* and *San Francisco Fire Code*. Existing buildings are required to meet standards contained in these codes. In addition, the building plans for any new residential project greater than two units are reviewed by the SFFD and DBI in order to ensure conformance with these provisions. Project buildings and structures would be required to conform to these standards, which (depending on building type) may also include development of an emergency procedure manual and an exit drill plan.

In addition, hazardous materials are required to be stored in designated areas designed to prevent accidental release to the environment. And *Hazardous Materials Management Act* requires that businesses handling or storing certain amounts of hazardous materials prepare a Hazardous Materials Business Plan (HMBP), which includes an inventory of hazardous materials stored on site (above specified quantities), an emergency response plan, and an employee-training program. The information required under the HMBP is available to fire and hazardous materials incident responders. Facilities where hazardous materials would be used during Project operation would be constructed in accordance with current laws and regulations, which require storage that minimizes exposure to people or the environment, and the potential for inadvertent releases that would require emergency response. The use of hazardous materials and generation of wastes would continue

[344] City and County Associations of Governments of San Mateo County, San Mateo County Comprehensive Airport Land Use Plan: San Francisco International Airport Land Use Plan, December 1996.

to be regulated under the authority of the DPH HMUPA under a compliance certificate, with additional oversight by other agencies (RHB, CDHS). Transporters of hazardous materials and wastes are required to comply with federal laws and regulations that are monitored and enforced by the CHP.

The existing street grid provides ample access for emergency responders and egress for residents and workers, and the Project would neither directly nor indirectly alter that situation to any substantial degree. All new development at would be built to *San Francisco Fire Code* standards, which would help to minimize demand for future fire protection services. All development, including high-rise residential buildings up to forty stories, would meet standards for emergency access, sprinkler and other water systems, and other requirements specified in the *San Francisco Fire Code*. Standards pertaining to equipment access would also be met. Plan review for structures at Candlestick Point for compliance with *San Francisco Fire Code* requirements, to be completed by DBI and the SFFD, would minimize fire-related emergency dispatches, reducing the demand for fire protection services at the Project site. Therefore, the Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Finally, for the reasons just set forth, the Project would not directly or indirectly result in any additional exposure of residents or workers to fire risk, as the Project site is in a fully urbanized area that lacks the "urban-wildland interface" that tends to place new development at risk in undeveloped areas of California. The Project would also include expansion of the Auxiliary Water Supply System (AWSS), to provide water for firefighting services. Expansion of the AWSS would make the Project site more defensible against fire and reduce the need for fire protection services. Therefore, the Project would not expose people or structures to a significant risk of loss, injury, or death involving fires.

Compliance with the *San Francisco Building Code* and *San Francisco Fire Code* through the City's ongoing permit review process would ensure that potential fire hazards related to redevelopment activities (including those associated with hillside development, hydrant water pressure, and emergency access) would be minimized during the permit review process and that future projects would not interfere with an existing emergency response or emergency evacuation plan. Therefore, this impact would be less than significant. No mitigation is required.

Cumulative Impacts

Risks associated with hazardous materials impacts are generally localized and site-specific, with the exception of those resulting from transportation of hazardous materials. Since these risks are generally site-specific, the cumulative context for this analysis varies, depending on the threshold being analyzed. For example, cumulative impacts associated with the transportation of hazardous materials would be analyzed for projects along the transportation route, while the context for the use of hazardous materials would be limited to the area immediately surrounding the Project site. Cumulative impacts associated with the accidental release of hazardous materials into the environment would also be limited to the Project site and the immediately surrounding properties. Cumulative impacts associated with emergency response would be limited to development in the vicinity of emergency access routes. Cumulative impacts associated with air emissions are analyzed in Section III.H.

Routine Transport, Use, and Disposal of Hazardous Materials

The geographic context for the analysis of cumulative impacts related to the routine transport of hazardous materials is the major access routes for the Project, which would include Innes Avenue, Cargo Way, Evans Avenue, Arelious Walker Drive, portions of Jamestown Avenue, and Harney Way. Cumulative development in this geographic area would include all past and present development as generally described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable development in this area would consist of the Yosemite Slough Restoration Project, Executive Park, Jamestown, Hunters View, India Basin Shoreline, and Hunters Point Shipyard Phase I.

The cumulative context for an analysis of impacts related to use and disposal of hazardous materials would include all development in the Project vicinity, defined as the area bounded by US-101 on the west and south, the Islais Creek Channel on the north, and the Bay on the east. Cumulative development in this geographic area would include all past and present development as generally described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable development in this area would consist of the Yosemite Slough Restoration Project, Executive Park, Jamestown, Hunters View, India Basin Shoreline, and Hunters Point Shipyard Phase I.

Cumulative projects could result in generation of hazardous wastes such as asbestos from friable building materials, lead-based paint on building surfaces, and lighting fixtures. In addition, previously unknown contamination, possibly the result of improper disposal or housekeeping activities, may be discovered as structures are demolished. Cumulative development could expose construction workers to health or safety risks through exposure to hazardous materials, although the individual workers potentially affected would vary from project to project. At the state level, DTSC administers laws and regulations related to hazardous waste and hazardous substances pursuant to Division 20, Chapters 6.5 and 6.8 of the *California Health and Safety Code* and CCR Title 22, which are the state equivalents of RCRA and CERCLA, respectively. The RWQCB enforces laws and regulations governing releases of hazardous substances and petroleum pursuant to pursuant to Division 20, Chapters 6.7, 6.75, and 6.8 of the *California Health and Safety Code* (Sections 25100, 25200 and 25300 et seq.), and the *Porter Cologne Water Quality Control Act* (Division 7, Section 13100 et seq. of the *California Water Code*) and CCR Title 23. In particular, the RWQCB focuses on all petroleum releases and those hazardous substance releases that may impact groundwater or surface water. In addition, the CDPH is responsible for ensuring facilities that use, store, or dispose of radiological materials are properly investigated, decontaminated, and decommissioned or licensed (or properly issued an exemption from such requirements) in accordance with state and federal laws and regulations, including the state Radiation Control Law (*California Health and Safety Code* Section 114960 et seq. and CCR Title 17, Division 1, Chapter 5. These regulations have been in place for many years. Consequently many past projects have and all present and reasonably foreseeable future projects would be required to comply with applicable federal, state, and local regulations. Compliance with applicable regulations and guidelines pertaining to hazardous materials would ensure that cumulative impacts from construction activities would be less than significant.

The Project Description identifies proposed land uses, but the specific businesses or activities that could operate in the Project are not known at this time. The analysis assumes nearly all Project uses would involve the routine use of hazardous materials at varying levels and that there is the potential that such use could result in a release of hazardous materials. In each case, the potential hazards and the risks they would pose

to people or the environment would depend on what materials would be used, where the materials would be used and stored, how they would be used, and who would use them. Uses proposed under the Project would include R&D, for which a wide variety of hazardous materials would be used, facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, and smaller-scale users, such as artists' studios and households, where only routine household types of chemicals would be used. Medical or dental offices could generate small quantities of medical waste that would be considered biohazardous, such as sharps, and would be required to comply with all code requirements related to disposal of these hazardous materials. No large-quantity waste generators would be developed as part of the Project. The Project would be required to comply with all local, state, and federal regulations pertaining to the use, handling, and disposal of hazardous materials.

Although existing, proposed, and reasonably foreseeable development could have potentially unique hazardous materials considerations, all such existing and potential users have and present and reasonably foreseeable future projects would comply with the range of federal, state, and local statutes and regulations applicable to the use, transport and disposal of hazardous materials, and would be required to comply with existing and future programs of enforcement by the appropriate regulatory agencies. Compliance with these federal, state, and local laws and regulations pertaining to hazardous materials management would be sufficient to minimize health and safety risks, because these laws and regulations have been designed to protect health and safety and are enforced by state and local agencies. For these reasons, potential cumulative impacts resulting from the use, transport, and disposal of hazardous materials would not be significant. Moreover, the Project would comply with all applicable statutes and regulations, which would ensure that the Project would not result in significant hazards as a result of hazardous materials use, transport, or disposal. Therefore, the Project's cumulative impact would be less than significant.

Reasonably Foreseeable Risk of Upset or Accident

The cumulative context for an analysis of impacts related to risk of upset or accident is the Project vicinity, defined as the area bounded by US-101 on the west and south, the Islais Creek Channel on the north, and the Bay on the east. Cumulative development in this geographic area would include all past and present development as generally described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable development in this area would consist of the Yosemite Slough Restoration Project, Executive Park, Jamestown, Hunters View, India Basin Shoreline, and Hunters Point Shipyard Phase I.

Cumulative development in this geographic area could handle or dispose of hazardous materials in such a way as to pose a risk from upset or accident. It is possible that cumulative development could expose residents and construction workers to contaminated soil or groundwater. There is known soil contamination at HPS, which would be remediated either by the Navy, as discussed above, or by the Project. Additional unknown soil or groundwater contamination could exist in the Project vicinity that could be released by development of the cumulative projects. *San Francisco Health Code* Article 22A, requires an investigation of the potential presence of hazardous wastes that may be present in soil within historic fill areas at construction sites as a prerequisite for certain building requirements. Such upsets or accidents, however, are likely to result in site-specific impacts and would not combine with another upset or accident that may occur on another site.

Hazardous waste may be generated from a site during construction and would need to be transported to a facility permitted to accept such waste. Management of specific hazardous wastes is addressed at the federal, state, and local levels. DTSC is authorized by USEPA to enforce the requirements of the federal RCRA. Under the state's Hazardous Waste Control Law, DTSC has adopted extensive regulations governing the generation, transportation, treatment, and disposal of hazardous wastes, which are more stringent than the requirements of RCRA. The state requirements for hazardous waste management specified in the *California Health and Safety Code*, Chapter 6.5, Article 2. The US DOT regulates hazardous materials transportation, including contaminated soil, between states, as described in Title 49 of the *Code of Federal Regulations*, and implemented by Title 13 of the CCR (California Vehicle Code). The California Highway Patrol and Caltrans are the state agencies with primary responsibility for enforcing federal and state regulations related to transportation within California.

Facilities where hazardous materials are used in the city must be constructed in compliance with current laws and regulations, which require hazardous materials storage that minimizes exposure to people or the environment, and the potential for inadvertent releases. In addition, these materials must be labeled to inform users of potential risks and to instruct them in appropriate storage, handling, and disposal procedures. Employers are required by law (Cal/OSHA) to ensure employee safety by properly identifying hazardous materials and adequately training workers. The use of hazardous materials and generation of wastes would continue to be regulated under the authority of the DPH HMUPA under a compliance certificate, with additional oversight by other agencies (RHB, CDHS). Transporters of hazardous materials and wastes are required to comply with federal laws and regulations that are monitored and enforced by the CHP. SFDPH HMUPA would continue to conduct periodic inspections throughout the City to ensure that hazardous materials and wastes are being used and stored properly. The City's

It is anticipated that all cumulative development projects would adhere to the applicable federal, state, and local laws and regulations that govern underground storage tanks and pesticide use, as well as requirements applicable to disposal and cleanup of contaminants. All cumulative projects would be required to comply with statutes and regulations pertaining to transport, use, handling, and disposal of hazardous materials, as noted, above. The regulatory schemes described above, however, include requirements for responding to such occurrences and ensuring that no health and safety impacts would result.

Cumulative projects could also affect the demand for hazardous materials emergency response services in the City, depending on the types of hazardous materials that would be handled. The likelihood of emergency incidents is more a function of the types of materials used as opposed to the quantities of materials used. Impacts on emergency services (fire, which includes hazmat response, and police) are analyzed in Section III.P (Public Services). The cumulative impact on emergency services was identified as less than significant.

All projects would be required to comply with applicable statutes and regulations, which would ensure that impacts related to the transport, use, and disposal of hazardous materials, would not be significant. Adherence to these regulations would also minimize the risk of upset or accident related to the handling of hazardous materials. For all of these reasons, potential cumulative impacts from the risk of upset or accident would not be significant. Additionally, mitigation measures for the Project have been included that would reduce the Project's impact related to risk of upset or accident to a less-than-significant level. Mitigation measures also require appropriate remediation of any site contamination. A site-specific

investigation would be conducted at locations where contaminated soils or groundwater could occur to minimize the exposure of workers to hazardous substances. The Project would be required to comply with all applicable codes and regulations to minimize or avoid risks from hazardous materials. As a result, the Project's cumulative impact would be less than significant.

Handling of Acutely Hazardous Materials within One-Quarter Mile of School

The geographic context for the analysis of this threshold is one-quarter mile of the schools that could be affected by the Project: the Bret Harte Elementary School and the private Muhammad University of Islam. No new schools are proposed within one-quarter mile of the Project. Development of cumulative projects could result in emissions of hazardous materials within one-quarter mile of these schools. As noted, above, hazardous materials are regulated through numerous codes and regulations, with oversight by various local, state, and federal agencies. These regulations are designed to ensure safety and human health. Risks associated with hazardous materials within one-quarter mile of an existing or proposed school would be eliminated or reduced through the requirements to comply with the handling, disposal practices, and/or cleanup procedures contained in these regulatory programs. Further, the Project's contribution to cumulative toxic air contaminant emissions would not exceed adopted BAAQMD thresholds (refer to Impact AQ-6 in Section III.H). Therefore, the Project's cumulative impact would be less than significant.

Hazardous Materials Release Sites

The cumulative context for an analysis of impacts related to hazardous materials sites is defined as the area bounded by US-101 on the west and south, the Islais Creek Channel on the north, and the Bay on the east. Cumulative development in this geographic area would include all past and present development as generally described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable development in this area would consist of the Yosemite Slough Restoration Project, Executive Park, Jamestown, Hunters View, India Basin Shoreline, and Hunters Point Shipyard Phase I.

Cumulative development in this geographic area may be located on or near a site included on a list of hazardous materials sites compiled pursuant to *Government Code* Section 65962.5. It is anticipated that future development would comply with applicable laws and regulations pertaining to hazardous wastes, and that risks associated with identified hazardous materials sites would be eliminated or reduced through compliance with the requirements for proper handling, disposal practices, and/or cleanup procedures. In many cases, development applications for projects affected by hazardous materials on identified sites would be denied by the City if adequate cleanup or treatment is not completed or feasible. Accordingly, cumulative impacts on the public or environment associated with development on or near hazardous materials sites would not be significant.

In June 2006, MACTEC conducted a Phase I Environmental Site Assessment (ESA) for Candlestick Point; in March 2009, MACTEC updated the assessment to include the proposed Candlestick Point Center, Alice Griffith housing development, the Jamestown Avenue parcels, and the CPSRA. No releases or areas of recognized environmental conditions were observed or noted during these Phase I assessments. The investigation report noted the presence of fill materials and a number of documented underground storage tanks (USTs) throughout Candlestick Point, some of which have been removed along with associated soil remediation. There may still be unknown USTs within Candlestick Point. No potentially significant impacts

from exposure to hazardous materials release sites were identified at the portions of Candlestick Point landward of the 1851 high-tide line (i.e., in bedrock areas and/or areas containing soil deposited by natural means), based on publicly available information. However, because there is a potential that previously unidentified (or unknown) contaminated sites could be encountered during development activities (either within the Project site or at off-site improvement locations), this EIR identifies mitigation measures consistent with applicable federal and state regulatory requirements to prevent those activities from adversely affecting human health and the environment.

As described previously, the historic uses at HPS by both the Navy and its tenants resulted in a number of hazardous materials release sites that are presently undergoing remediation by the Navy under federal law under the supervision of federal and state environmental agencies and in accordance with CERCLA. The Navy and regulatory agencies have determined that none of the areas that are accessible to tenants and visitors is a hazard to current tenants and visitors as determined in the 2008 Finding of Suitability to Lease (FOSL) issued by the Navy. All necessary remedial actions at HPS Phase II required by CERCLA, the FFA, or other applicable law must be completed to the satisfaction of the relevant regulatory agencies, and those agencies must determine that the site is suitable for its intended use, whether those remedial activities take place before or after the Navy transfers ownership of the property. The mitigation measures set forth in this section require the Project to be consistent with any requirements imposed as part of these remediation programs, and the federal, state, and local laws governing those remediation programs. Mitigation measures for the Project describe the required process if previously unidentified soil or groundwater contamination were encountered during construction or operation of the Project on any portion of the site and would ensure proper remediation in accordance with appropriate guidelines and applicable federal, state, and local laws and regulations. As a result, the Project's cumulative impact would be less than significant.

Impair Implementation of Adopted Emergency Response Plans

The geographic context for emergency response is the City and County of San Francisco. The City has an Emergency Response Plan (ERP) that was developed to ensure allocation of and coordination of resources in the event of an emergency in the City and County of San Francisco. Because the ERP is the planning document for the entire city and county, cumulative Project impacts are considered within that planning context.

The ERP describes at a high level what the City's actions will be during an emergency response. Forthcoming annexes and appendices to this plan will describe in more detail response actions and hazards specific to CCSF. While these additional plans are in development, existing departmental plans and hazard-specific annexes remain in effect. Further, this plan describes the role of the Emergency Operations Center (EOC) and the coordination that occurs between the EOC, City departments, and other response agencies. Finally, this plan describes how the EOC serves as the focal point between federal, state, and local governments in times of disaster.[345] A separate Hazard Mitigation Plan (HMP) assesses risks posed by natural and human-caused hazards and set forth a mitigation strategy for reducing the City's risks. Section 5.2.3.3 of the HMP describes the types, location, and probability of hazardous materials incidents.

[345] City and County of San Francisco, Emergency Response Plan, an Element of the CCSF Emergency Management Program, April 2008. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

The HMP reports, a hazardous materials event is most likely to occur within the City's industrial area, and along land and water transportation corridors. Trucks and vessels that use these transportation corridors commonly carry a variety of hazardous materials, including gasoline, other petroleum products, and other chemicals known to cause human health problems. The HMP also notes comprehensive information on the probability and magnitude of a hazardous material event along the transportation corridors is not available. Wide variations among the characteristics of hazardous material sources and among the materials themselves make such an evaluation difficult. However, based on previous occurrences, San Francisco can expect, on average, a hazardous material event every 4 years due to a truck accident and 7 times a year due to a large vessel accident as a result of equipment failure or operator error.[346]

The specific departmental responsibilities for responding to hazardous materials incidents in the City are outlined in the "Emergency Support Function #10 Oil and Hazardous Materials Response Annex" to the ERP.[347] San Francisco Fire Department (SFFD) is the first responder in responding to hazardous materials emergencies for the city and county.

San Francisco ensures fire safety primarily through provisions of the *San Francisco Building Code* and *San Francisco Fire Code*. Many existing buildings are required to meet standards contained in these codes. In addition, the building plans for any new residential project greater than two units are reviewed by the SFFD and DBI in order to ensure conformance with these provisions. All new development would be built to *San Francisco Fire Code* standards and required to meet standards for emergency access, sprinkler and other water systems, and other requirements specified in the *San Francisco Fire Code*. Project buildings and structures would be required to conform to these standards, which (depending on building type) may also include development of an emergency procedure manual and an exit drill plan. Plan review for structures at Candlestick Point for compliance with *San Francisco Fire Code* requirements, to be completed by DBI and the SFFD, would minimize fire-related hazardous materials emergency dispatches, reducing the demand for fire protection services at the Project site. Therefore, the Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Finally, for the reasons set forth above, neither the Project nor other cumulative development would directly or indirectly result in any additional exposure of residents or workers to fire risk, as the Project site and the surrounding area are fully urbanized and lack the "urban-wildland interface" that tends to place new development at risk in undeveloped areas of California. The Project would also include expansion of the Auxiliary Water Supply System (AWSS), to provide water for firefighting services. Expansion of the AWSS would make the Project site more defensible against fire and reduce the need for fire protection services. Compliance with the *San Francisco Building Code* and *San Francisco Fire Code* through the City's ongoing permit review process would ensure that potential fire hazards related to redevelopment activities (including those associated with hillside development, hydrant water pressure, and emergency access) would be minimized during the permit review process and that future projects would not interfere with an existing emergency

[346] City and County of San Francisco, Emergency Response Plan, Emergency Support Function #10 Oil and Hazardous Materials Response Annex. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[347] City and County of San Francisco, Emergency Response Plan, an Element of the CCSF Emergency Management Program, April 2008. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

response or emergency evacuation plan. Therefore, because all cumulative development would be required to comply with applicable codes that would ensure effective implementation of the City's existing emergency plans, the Project's cumulative impact would be less than significant.

SECTION III.L GEOLOGY AND SOILS

III.L.1 Introduction

This section describes the geologic and seismic setting of the Project site, including regional and local geology, soils and groundwater, and the regulatory framework relevant to the Project. The potential environmental effects of the Project related to geology, soils, and seismicity are described. The impacts examined include risks related to geologic hazards such as earthquakes, landslides, liquefaction, expansive soils, and impacts on the environment related to soil erosion and sedimentation. This section identifies Project level and cumulative environmental impacts and explains how compliance with the applicable regulations, which are also identified as the mitigation measures, would reduce or avoid the identified impacts.

The Setting describes the local geologic setting and soils information for Candlestick Point (including the proposed Yosemite Slough bridge area) and for HPS Phase II. The EIR glossary, in Chapter VIII, defines unique terms used in the text below.

A preliminary geotechnical assessment of the Project site has been completed by ENGEO for Lennar Urban (refer to Appendix L [Geotechnical Report]).[348] The assessment is based on previous site-specific geotechnical and hazardous material investigations, some of which include subsurface borings, and review of published geologic reports and maps. This preliminary geotechnical assessment describes and evaluates geologic and geotechnical conditions at the Project site to support preliminary planning and conceptual-level design during initial phases of project planning. A design investigation to support preliminary infrastructure design efforts is underway at the time this EIR is being prepared. Design-level geotechnical studies would be completed on a parcel-by-parcel basis during development of construction plans.[349] Once infrastructure development is complete, foundation recommendations, which may or may not involve further exploration, would be required for each block. For high-rise structures, a unique foundation recommendation report would be required for each such building. The preliminary geotechnical assessment provides a summary and compilation of available geotechnical information that was used as part of the analysis of geologic, seismic, and geotechnical issues for this EIR.

III.L.2 Setting

The Project site is located in the southeastern area of San Francisco and extends east to San Francisco Bay (refer to Figure II-1 [Project Location]). This promontory is bounded on the south and west by the Bayview Hunters Point neighborhood and on the north and east by San Francisco Bay. The ground surface across the entire Project site is relatively flat with elevations ranging from approximately 0 feet to +20 feet (San

[348] ENGEO, Inc., *Preliminary Geotechnical Conceptual Design Report, Hunters Point Shipyard Phase II and Candlestick Point, San Francisco, California*, May 2009.
[349] ENGEO, 2009.

Francisco City Datum [SFCD]).[350] Maximum ground surface elevation near the Project site is on Bayview Hill (west of Candlestick Point), which reaches an elevation of approximately 400 feet SFCD.

Regional Geology

San Francisco Bay and the alluvial, colluvial, and estuarine deposits that underlie much of the Project site (and surrounding areas) occupy a structurally controlled basin in California's Coast Ranges province, which consists of 500 miles of northwest-trending ridges and valleys. Late Pleistocene and Holocene sediments (less than 1.0 million years old) were deposited in the basin as it subsided.[351] In the Project site, these sediments comprise estuarine deposits of Old Bay Clay, undifferentiated sedimentary deposits, Young Bay Mud, and alluvial/colluvial deposits, all of which rest on a variety of bedrock types associated with the Franciscan Complex. The Franciscan Complex makes up much of the basement rock of the Coast Ranges and consists of an assemblage of deformed and metamorphosed rock units. It formed in association with continuous east-dipping subduction at the margin of the North American and Pacific plates.[352] These two plates move relative to each other, with the San Andreas Fault Zone at the junction. The Pacific plate, on the west side of the fault zone, is moving north relative to the North American plate on the east.

Hunters Point Shear Zone

The Franciscan Complex north of Yosemite Slough is part of the Hunters Point shear zone, most of which is in the HPS Phase II site (refer to Figure III.L-1 [Geologic Map]). The Hunters Point shear zone consists of a shale matrix and serpentinite mélange that contains lenses of different lithologies (rock types). Regionally, the shear zone strikes northwestward and dips northeast at shallow to moderate angles.[353] The shear zone is thought to be part of a major structural zone marked by shallow bedrock that extends across the southeastern section of the San Francisco Peninsula, and southeast into the Bay. In the Project site, the southeastern margin of the shear zone extends from the Bay shoreline between Yosemite Slough and the southern base of Hunters Point in a northwest direction that intersects US-101 east of and adjacent to Islais Creek. The shear zone probably is not active, based on lack of offset of overlying sediments recorded by detailed seismic reflection studies.[354]

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[350] San Francisco City Datum (SFCD) is a local vertical geodetic reference system specific to the City and County of San Francisco and formally established in 1964 as 8.616 feet above the National Geodetic Vertical Datum of 1929 (NGVD29), making it about 8.13 feet above mean sea level. The North American Vertical Datum was established in 1988 (NAVD88) and generally has replaced NGVD29 as a standard reference. Elevations expressed in NGVD29 may be converted to NAVD88 by adding 2.69 feet.

[351] Schlocker, J., *Geology of the San Francisco North Quadrangle, California*, 1974, USGS professional paper 782.

[352] Wahrhaftig, C., *A Streetcar to Subduction*, 1984; Wahrhaftig, C. and Wakabayashi, J., *Tectonostratigraphic Terranes* in *Geology of SF and Vicinity, Field Trip Guide T105*, 1989, p. 6-8; Schlocker, J., 1974.

[353] Wakabayashi, J., *Nappes, tectonics of oblique plate convergence, and metamorphic evolution related to 140 million years of continuous subduction, Franciscan complex, CA*: Journal of Geology, v. 100, 1992, pp. 19-40.

[354] Marlow, M. et al, *High-resolution seismic-reflection profiles and interpretation pitfalls created by acoustic anomalies from Holocene muds beneath south SF Bay*, USGS OFR 94-639, 1994, p. 16.

SOURCE: Geotechnical Consultants Inc., USGS, 1998, Open File Report 98-354.

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GEOLOGIC UNITS

- Qaf – Artificial fill
- Qaf/tf – Artificial fill over Tidal flat
- Ql – Landslide deposits
- Qsr – Slope debris and Ravine fill
- Qu – Undifferentiated surficial deposits

Franciscan Complex

- KJs – Sanstone and Shale
- KJc – Chert
- KJg – Greenstone
- KJu – Sheared rocks/Melange
- sp – Serpentine

GEOLOGIC CONTACTS

- Contact, approximately located
- Approximate 1800's shoreline
- Project Boundary
- NAP Not-a-Part

Candlestick Point — Hunters Point Shipyard Phase II EIR

GEOLOGIC MAP

FIGURE III.L-1

The Franciscan Complex south of the Hunters Point shear zone is referred to as the Central terrane,[355] which is bound by the Hunters Point shear zone to the north and the City College fault zone, an inactive fault zone about one mile southwest of Candlestick Point, to the south (refer to Figure III.L-2 [Regional Fault Map]).[356]

Local Geology

Five soil and geologic units underlie the Project site. In general, basement units of the Franciscan Complex are covered by Quaternary sands, Bay Mud deposits, and artificial fill on the topographically low areas bordering San Francisco Bay.[357] The units are described from youngest to oldest, which approximates their vertical distribution from the top to the deeper units. Table III.L-1 (Summary of Geologic Conditions at Candlestick Point) and Table III.L-2 (Summary of Geologic Conditions at Hunters Point Shipyard Phase II) present general descriptions of the geologic units.

Table III.L-1 Summary of Geologic Units at Candlestick Point

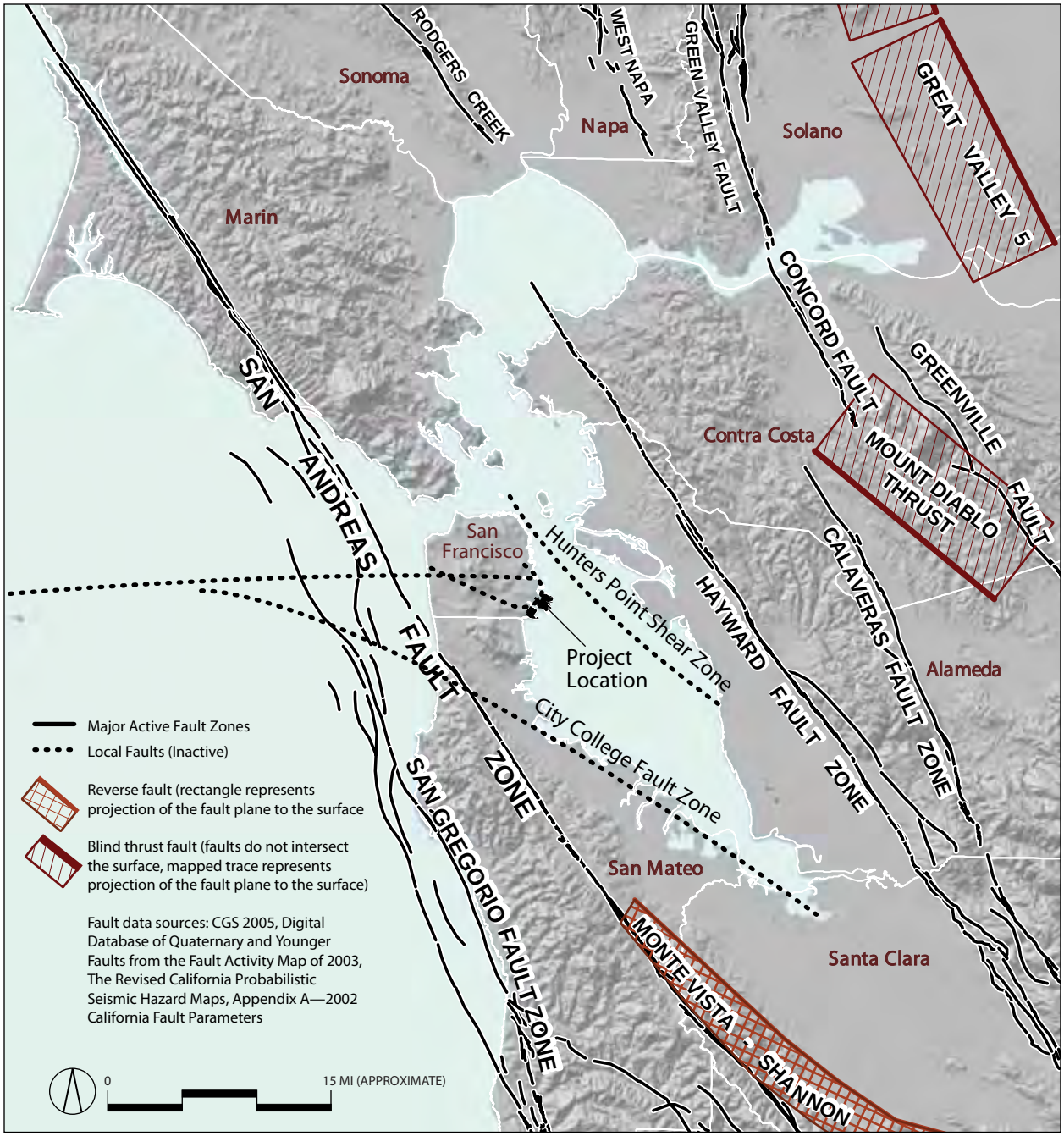
Geologic Unit	*Map Symbol*	*Age*	*Lithology*
Artificial Fill	Qaf	Historic (0-200 years old)	Mixture of sand, gravel, and some clay. Abundant debris including wood, glass, and brick.
Slope Debris and Ravine Fill	Qsr	Holocene to Pleistocene (0-1.8 million years old)	Undifferentiated deposits of alluvium/colluvium consisting of clay to sandy clay, sandy silt, clayey to silty sand, clean sand, and silty gravel.
Bay Mud Deposits	Qm	Holocene to Pleistocene (0-1.8 million years old)	Highly compressible clay with minor layers of silt and clayey sand. Some shell fragments.
Undifferentiated Sedimentary Deposits	Qu	Holocene to Pleistocene (0-1.8 million years old)	Interbedded alluvial and marine deposits, light brown to yellowish brown, fine to medium grained, clean to clayey sand, and interbedded with stiff to very stiff, lean clay. Contains shell fragments. May contain some Colma Formation (Qc)
Franciscan Complex	KJs, KJc, KJg	Cretaceous to Jurassic (65 to 165 million years old)	Mixed assemblage of distinct bedrock types, including shale, chert, sandstone, and greenstone.

SOURCE: Bonilla, 1998; ENGEO, 2009

[355] Blake, M., et al, *Preliminary Tectonostratigraphic Terrane Map of CA*, USGS OFR 82-593, 1982, *Tectonostratigraphic Terranes of the San Francisco Bay Region* in *Franciscan Geology of Northern CA, Pacific Section*, Society of Economic Paleontologists and Mineralogists, 1984, v.43 p. 5-22; Graymer, R., et al, *Beyond the Golden Gate—Oceanography, Geology, Biology and Environmental Issues in the Gulf of the Farallones*, "Earthquakes, Faults and Tectonics", USGS circular 1198, 2000, pp.37-46; Wahrhaftig, C. and Wakabayashi, J., 1989.

[356] Ninyo &Moore, *Geologic Hazards Assessment and Geotechnical Evaluation, Ocean Campus Soccer Field, City College of San Francisco, San Francisco, California*, Project Number 400943008, November 14, 2008, pp. 11–12.

[357] ENGEO, Lennar Urban, MACTEC Proposed Infrastructure and Implementation Schedule, Hunters Point/Candlestick Point Redevelopment Project, ENGEO Geotechnical Design, May 7, 2008.



SOURCE: Geotechnical Consultants Inc, 2008.

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FIGURE III.L-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

REGIONAL FAULT MAP

Table III.L-2 Summary of Geologic Conditions at Hunters Point Shipyard Phase II

Geologic Unit	*Map Symbol*	*Age*	*Lithology*
Artificial Fill	Qaf	Historic (0-200 years old)	Mixture of sand, gravel, and some clay. Abundant debris including wood, glass, and brick.
Slope Debris and Ravine Fill	Qsr	Holocene to Pleistocene (0-1.8 million years old)	Undifferentiated deposits of alluvium/colluvium consisting of clay to sandy clay, sandy silt, clayey to silty sand, clean sand, and silty gravel.
Bay Mud Deposits	Qm	Holocene to Pleistocene (0-1.8 million years old)	Highly compressible clay with minor layers of silt and clayey sand. Some shell fragments.
Undifferentiated Sedimentary Deposits	Qu	Holocene to Pleistocene (0-1.8 million years old)	Interbedded alluvial and marine deposits, light brown to yellowish brown, fine to medium grained, clean to clayey sand, and interbedded with stiff to very stiff, lean clay. Contains shell fragments. May contain some Colma Formation (Qc)
Franciscan Complex	KJs, KJc, KJg, sp	Cretaceous to Jurassic (65 to 165 million years old)	Mixed assemblage of distinct bedrock types, including serpentinite, shale, chert, sandstone, and greenstone.

SOURCE: ENGEO, 2009

Artificial Fill (Qaf). Based on geotechnical borings, the Project site is blanketed with artificial fill, typically ranging in thickness from approximately 1 to 70 feet.[358] These deposits are thickest over closed depressions and gullies in the upper surface of the Bay Mud deposits (refer to discussion below), and thinnest over ridges in the Bay Mud surface.[359] Historical shoreline maps show artificial fill has been extended as far as 3,500 feet beyond the original shoreline in some areas around Candlestick Point and the HPS Phase II.[360] The fill lies on the Young Bay Mud, on competent alluvial/colluvial deposits, or on bedrock. In some instances, the weight of the fill created "mud waves" as the fill was placed on top of the soft Bay Mud surface. In this case, the process of fill placement pushed the soft Bay Mud beneath the fill out toward the Bay. This created deeper sections of fill where the Bay Mud was displaced beneath it.[361] The fill is primarily granular in nature, generally composed of excavated Franciscan Complex bedrock,[362] with the majority comprising a heterogeneous matrix of sand and gravel with varying amounts of clay and silt. The density of the fill is wide ranging, from loose to very dense granular materials and soft to stiff clays and silts. The artificial fill may include man-made debris such as wood, glass, brick, concrete blocks, and other industrial debris.[363] In the vicinity of the southeast-facing shoreline of Parcels D and E at HPS Phase II, it appears that a portion of the fill was constructed by placing dredged sand over Bay Mud. This fill consists of poorly graded (uniform) loose sands and its properties are inherently different than the fill elsewhere on site.

358 PRC, et al., *Parcel E Remediation Investigation Draft Report, Hunters Point Shipyard, San Francisco, CA*, 1997, Part of Comprehensive Long Term Environmental action Navy (Clean II).
359 PRC, et al., 1997.
360 ENGEO, 2009.
361 ENGEO, 2009.
362 PRC, et al., 1997.
363 Geotechnical Consultants, Inc., (GTC), *Report and Assessment of Available Geotechnical/Geologic Information*, Revision 1.0, Bayview Transportation Improvements Project, 2005; Bonilla, M., *Preliminary Geologic Map of the San Francisco South 7.5-minute Quadrangle and Hunters Point 7.5-minute Quadrangle, SF, CA*, 1998, USGS OFR 98-354; PRC, et al., 1997.

Slope Debris and Ravine Fill (Qsr). In the Project site, undifferentiated deposits of alluvium/colluvium occur primarily in areas immediately adjacent to bedrock exposures, at the base of slopes, and in accumulations in swales and gullies and are designated slope debris and ravine fill.[364] These deposits consist primarily of clay to sandy clay, sandy silt, clayey to silty sand, clean sand, and silty gravel.[365] These deposits include older colluvium that typically occurs between estuarine deposits and bedrock.

Bay Mud Deposits (Qm). Bay Mud is divided into younger and older deposits. Young Bay Mud underlies artificial fill in areas on which estuarine sediments were deposited and ranges in thickness from approximately 1 to 70 feet.[366] The Young Bay Mud consists predominantly of high plasticity clay with minor layers of lean to sandy clay, silt to clayey silt, and clayey sand, with some peat interbeds and lenses.[367] The Young Bay Mud typically is olive to dark greenish gray to blue gray, very soft to medium stiff, and contains abundant shell fragments.[368] The Young Bay Mud generally is normally consolidated and moderately to highly compressible. Where the Bay Mud has been further consolidated under the weight of fill, it has moderate shear strength. The Bay Mud thins to zero inland and thickens toward the Bay.[369] In some areas, where mud waves formed during placement of fill, the Bay Mud may be thicker or thinner than the original deposit. Locally, the deeper units of older Bay Mud, known as Old Bay Clay, are overconsolidated, and are composed of stiff to very stiff, silty to sandy clay, clayey silt, and clayey to silty sand.

Undifferentiated Sedimentary Deposits (Qu). These interbedded alluvial and marine deposits underlie younger Bay Mud deposits and overlie and interfinger with older Bay Mud deposits. Locally, they overlie basement rock directly.[370] Mostly composed of light brown to yellowish brown, fine to medium grained, poorly graded, medium dense to very dense, clean sand to clayey sand, these deposits are interbedded with stiff to very stiff, lean clay and contain some shell fragments.[371] Locally, these deposits may include sands of the Colma Formation (Qc).[372]

Franciscan Complex (KJ). The Franciscan Complex is a mixed assemblage of lithologically distinct rock types that are interbedded and tectonically disturbed.[373] The predominant Franciscan Complex rock types in the Project site are serpentinite, sandstone, chert, shale, and greenstone.[374] In the Project site, bedrock outcrops predominantly consist of chert, shale, and greenstone in the Candlestick Point site adjacent to the Bay and serpentinite, chert, sandstone, and shale in the HPS Phase II site.[375]

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364 Bonilla, 1998.
365 CGKT, Consulting Engineers, "Bayside Facilities Plan, Expanded Geotechnical Investigation, Geotechnical Reference Report," Prepared for San Francisco Clean Water Program, City and County of San Francisco, 1982; Bonilla, 1998.
366 GTC, 2005.
367 PRC, et al., 1997.
368 Bonilla, 1998.
369 PRC, et al., 1997.
370 GTC, 2005.
371 PRC, et al., 1997.
372 PRC, et al., 1997.
373 Schlocker, 1974.
374 Wahrhaftig, C.,1984.
375 Bonilla, 1998.

Soils

Soils at the Project site are imported fill material, and are derived from weathered materials and underlying rock or other natural deposits.[376] Soil types on the Project site were identified from soil survey data published by the US Department of Agriculture, Natural Resources Conservation Service.[377] The basic soil types mapped at the Project site are as follows:

- **Candlestick Point.** Candlestick Point site soils are predominantly "Urban land, Urban land—Orthents" (both cut & fill complex and reclaimed complex); Orthents soils in the low-lying areas; and Barnabe-Candlestick complex in the upland areas near Bayview Hill.
- **HPS Phase II.** HPS Phase II site soils are predominantly "Urban land, Orthents—cut and fill" and Urban land—Orthents (reclaimed complex).

Soil corrosivity against concrete and uncoated steel is moderate in the Barnabe-Candlestick complex soils. All the soil types at the Project site are interpreted to have a moderate corrosivity rating.[378]

A soil erosion hazard rating determines how likely it is that a soil will erode. Ratings are based on geology, topography, soil depth, vegetative cover, soil texture, and a climatic stress factor, which is a function of mean annual precipitation. Because of the variable nature of the deposits, all soil types at the Project site are interpreted to have a slight to severe erosion hazard rating.[379]

Consolidation Settlement of Young Bay Mud

Consolidation settlement occurs when a fine-grained soil (silt or clay) is loaded with the weight of new fill or of improvements such as structures or roads. New loads cause increases in soil pore water pressure. As the excess pore pressures dissipate, the soil volume decreases and water is expelled slowly. The rate of settlement depends on the permeability and thickness of the soil layers. Thick layers of clay with low permeability can take years for pore pressures to dissipate fully. It appears that most, if not all, the Young Bay Mud underlying the Project site is normally consolidated under the load of the existing fill and buildings. Placement of new fill to raise grades and construction of new buildings with shallow foundations in areas underlain by Young Bay Mud may trigger new consolidation settlement.

Compressible clays such as Young Bay Mud also exhibit secondary consolidation or compression as a function of the increased effective stress. The mechanism of secondary compression generally is thought to result from re-orientation of clay minerals under stress. Decomposition of organic content may be a factor in materials such as Young Bay Mud. Although settlement caused by secondary compression will decrease eventually, it will continue for an order of magnitude longer than primary consolidation. Continuing settlement caused by secondary compression in response to placing new fill is likely to be very small, except near the eastern shoreline of Candlestick Point where an area of deeper Young Bay Mud exists.

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376 PRC, et al., 1997.
377 Natural Resources Conservation Service (NRCS) Web Soil Survey website. http://websoilsurvey.nrcs.usda.gov/app/websoilsurvey.aspx (accessed April 2008).
378 Natural Resources Conservation Service website. http://sdmdataaccess. nrcs.usda.gov (accessed April 2008).
379 NRCS (accessed April 2008).

The deeper-lying Old Bay Clays are overconsolidated and will experience very small settlement as long as their maximum past pressure is not exceeded.

Slope Stability

Slope failures include many phenomena that involve the downslope displacement of material, triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces, such as landslides, rock-falls, debris slides, and soil creeps. Slope stability can depend on a number of complex variables, including the geology, structure, and amount of groundwater present, as well as external processes such as climate, topography, slope geometry, and human activity. Landslides and other slope failures may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and offset surfaces.

- **Candlestick Point.** Potential landslide hazards at the Candlestick Point site are presented in Figure III.L-3 (Seismic Hazard Map). The figure shows that the major landslide hazard area at the Project site is an approximate 2,500-foot-wide and 2,500-foot-long section above Jamestown Avenue, east of US-101 and west of Candlestick Point State Recreation Area (CPSRA).
- **HPS Phase II.** A few smaller landslide hazards existed in a large serpentinite block of the Hunters Point Shear Zone, between Innes and Crisp Roads, northwest of the HPS Phase II site (refer to Figure III.L-3).[380] However, slopes adjacent to HPS Phase II have been rebuilt as subdrained engineered slopes as part of on-going HPS Phase I development. Remaining potential landslide hazard areas are outside of HPS Phase II site boundaries.

Groundwater Levels

Groundwater levels in the artificial fill and the underlying estuarine deposits generally are less than 15 feet below the ground surface and experience varying degrees of tidal fluctuation. In the upland or hilly areas, seasonally influenced groundwater occurs in artificial fill and alluvium/colluvium (slope/ravine deposits) at wide ranging depths below the ground surface.[381] Historically, depths to groundwater in the undifferentiated sedimentary deposits have been measured as shallow as three feet in the lowland areas and as deep as 30 feet below ground surface in the upland areas.[382]

[380] California Geological Survey (CGS), Seismic Hazard Zone Map, CCSF, 2000.
[381] GTC, 2005.
[382] PRC, et al, 1997.

SOURCE: Geotechnical Consultants Inc.; Seismic Hazard Zone Map, City and County of San Francisco, California Geological Survey, November 2001.

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Liquifaction hazard zone Landslide hazard zone Project Boundary NAP Not-a-Part

Candlestick Point — Hunters Point Shipyard Phase II EIR

SEISMIC HAZARD MAP

FIGURE III.L-3

Faulting and Seismic Hazards

Regional Seismicity

The San Francisco Bay Area is in a seismically active region near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast. Since approximately 23 million years ago, about 200 miles of right-lateral slip has occurred along the San Andreas Fault Zone to accommodate the relative movement between these two plates. The relative movement between the Pacific Plate and the North American Plate generally occurs across a 50-mile zone extending from the San Gregorio Fault in the southwest to the Great Valley Thrust Belt to the northeast. In addition to the right lateral slip movement between tectonic plates, a compressional component of relative movement has developed between the Pacific Plate and a smaller segment of the North American Plate at the latitude of San Francisco Bay during the last 3.5 million years.[383] Strain produced by the relative motions of these plates is relieved by right lateral strike slip faulting on the San Andreas and related faults, and by vertical reverse-slip displacement on the Great Valley and other thrust faults in the central California area.[384]

The San Francisco Bay Area and surrounding areas are characterized by numerous geologically young faults. Figure III.L-2 (Regional Fault Map) illustrates the fault locations in relation to the Project site. These faults can be classified as historically active, active, sufficiently active, or inactive, as defined below.[385]

- Faults that have generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years) and faults that exhibit a seismic fault creep defined as **historically active**.[386]
- Faults that show geologic evidence of movement within Holocene time (approximately the last 11,000 years) are defined as **active**.
- Faults that show geologic evidence of movement during the Holocene along one or more of their segments or branches and if their traces may be identified by direct or indirect methods are defined as **sufficiently active** and **well defined**.
- Faults that show direct geologic evidence of inactivity or lack of offset, during all of Quaternary time or longer are classified as **inactive**.

The California Geological Survey (CGS) does not attempt to quantify the probability that an earthquake will occur on any specific fault, but this classification is based on the reasonable assumption that if a fault has moved during the last 11,000 years, it is likely to produce earthquakes in the future.

Groundshaking

An earthquake is classified by the amount of energy released, which traditionally has been quantified using the Richter scale. Recently, seismologists have begun using a moment magnitude (M) scale because it provides a more accurate measurement of the size of major and great earthquakes. For earthquakes of less

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383 Fenton and Hitchcock, *Recent geomorphic and paleoseismic investigations of thrust faults in Santa Clara Valley, California*, in Ferriz, H., and Anderson, R. eds., *Engineering Geology Practice in Northern California: California Division of Mines and Geology Bulletin 210*, 2001, pp. 239-257.

384 A "reverse-slip" fault is one with predominantly vertical movement in which the upper block moves upward in relation to the lower block.

385 CGS, *Fault Rupture Hazard Zones in California*, CDMG Special Publication 42, 2007, p.5.

386 Fault creep is movement along a fault that does not entail earthquake activity.

than M 7.0, the moment and Richter magnitude scales are nearly identical. For earthquake magnitudes greater than M 7.0, readings on the moment magnitude scale are slightly higher than a corresponding Richter magnitude.

The intensity of the seismic shaking, or strong ground motion, during an earthquake is dependent on the distance and direction between a particular area and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding that area. Earthquakes occurring on faults closest to the Project site probably would generate the largest ground motions.

A review of historic earthquake activity from 1800 to 2005 indicates that 13 earthquakes of magnitude M 6.0 or greater have occurred in the vicinity of the Project site during this time frame. The two most consequential were the earthquakes of April 18, 1906 and October 17, 1989. The April 18, 1906 earthquake caused building collapses and fires, approximately 3,000 deaths, and $524 million in damage as far as 350 miles from the epicenter. The earthquake of October 17, 1989 caused 63 deaths, more than 3,000 injuries, and an estimated $6 billion in property damage from San Francisco to Monterey and in the East Bay, including damage and destruction of buildings, roads, bridges, and freeways. There have been 25 earthquakes with magnitudes between M 5.5 and M 6.0 in this area during this time period, including numerous aftershocks of larger earthquakes.[387]

The intensity of earthquake-induced ground motions can be described using peak ground accelerations, represented as a fraction of the acceleration of gravity (g).[388] The interactive CGS Probabilistic Seismic Hazard Assessment map provides data to estimate peak ground accelerations in California.[389] Taking into consideration the uncertainties regarding the size and location of earthquakes and the resulting ground motions that can affect a particular site, the map depicts peak ground accelerations with a 10 percent probability of being exceeded in 50 years, which equals an annual probability of 1 in 475 of being exceeded in any given year. The CGS Probabilistic Seismic Hazard Assessment map accounts for amplification. Amplification effects can occur when seismic waves travel through soft soils underlain by shallow bedrock.

Fault Rupture

Faults are geologic zones of weakness. Surface rupture occurs when movement on a fault deep in the earth breaks through to the ground surface. Surface ruptures associated with the 1906 San Francisco earthquake extended for more than 260 miles with displacements of up to 21 feet. Not all earthquakes result in surface rupture. The 1989 Loma Prieta earthquake caused major damage in the San Francisco Bay Area, but the fault trace does not appear to have broken at the ground surface.

Fault rupture almost always follows preexisting faults, which are zones of weakness. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Sudden displacements are more damaging to structures because they are accompanied by shaking.

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[387] California Geologic Survey website: Regional Geologic Mapping Program, Significant California Earthquakes. http://www.consrv.ca.gov/cgs/rghm/quakes/Pages/eq_chron.aspx.

[388] Acceleration of gravity (g) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

[389] CGS, Probabilistic Seismic Hazards Mapping (PSHM) Ground Motion website. http://www.consrv.ca.gov/cgs/rghm/pshamap (accessed June 2006).

Liquefaction

Liquefaction is a phenomenon in which saturated granular, non-plastic sediments temporarily lose their shear strength during periods of strong groundshaking, such as that which occurs during earthquakes. Seismic waves traveling through soils can cause deformations that collapse the loose granular structure. This collapse of void space in turn can cause an increase in pore water pressure, reducing the effective stress between the grains. When the pore pressures reach a critical level at which the effective stress of the soil drops below the overburden stress, the previously solid granular soil loses the strength to support itself and may behave like a viscous fluid. Secondary effects associated with liquefaction include flow failures, which occur when liquefied soil moves down a steep slope with large displacement and much internal disruption of material. Soil may also lose its ability to support structures, and this loss of bearing strength may cause structures founded on the liquefied materials to tilt or possibly topple over. Light structures such as pipelines, sewers, and empty fuel tanks that are buried in the ground can float to the surface when they are surrounded by liquefied soil. The susceptibility of a site to liquefaction is a function of the uniformity, depth, density, and water content of the granular sediments beneath the site and the magnitude of earthquakes likely to affect the site.

The vast majority of liquefaction hazards are associated with sandy soils and silty soils of low plasticity. Cohesive soils generally are not considered susceptible to soil liquefaction. In addition to sandy and silty soils, some gravelly soils are potentially vulnerable to liquefaction. Most gravelly soils drain relatively well, but when their voids are filled with finer particles or they are surrounded by less pervious soils, drainage can be impeded and they may be vulnerable to cyclic pore pressure generation and liquefaction. In general, liquefaction hazards are most severe in the first 50 feet below the ground surface, but on a slope near a free face or where deep foundations go beyond that depth, liquefaction potential should be considered for greater depths. There are two general levels of liquefaction hazards: (1) large-scale displacement and (2) localized failures including lateral spreading, vertical settlement from densification, sand boils, ground oscillation, flow failures, loss of bearing strength, and buoyancy effects, as described below.

Lateral Spreading

Lateral spreading is a phenomenon where large blocks of intact, nonliquefied soil move downslope riding on a liquefied substrate of large extent[390]. The mass moves toward an unconfined area, such as a descending slope or stream-cut bluff, and can occur on slope gradients as gentle as one degree.

Earthquake-Induced Settlement

Settlement or subsidence of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid rearrangement, compaction, and settling of subsurface materials (particularly loose, uncompacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Localized

[390] Youd, T., et al., "Mapping liquefaction induced ground failure potential", in Proceedings of American Society of Civil Engineers, Journal of the Geotechnical Engineering Division, 1978; Tinsley, J., et al., Evaluating Liquefaction Potential. In *Evaluating Earthquake Hazards in the Los Angeles Region—an Earth Science Perspective*, USGS professional paper 1360, 1985, p. 263-315.

differential settlements up to two-thirds of the total settlements anticipated must be assumed until more precise predictions of differential settlements can be made.

Sand Boils

Sand boils occur when localized pore pressures increase to a level greater than the overburden pressure. If there is no pathway for dissipation of the excess pore pressures, the liquefied material may travel upward, following the path of a vertical fracture or zone of weakness. Sand-laden water can be ejected from a buried liquefied layer and erupt at the surface to form sand volcanoes. The surrounding ground often fractures and settles in the vicinity of the sand boil.

Ground Oscillation

During ground oscillation, the surface layer, riding on a buried liquefied layer, is thrown back and forth by the shaking and can be severely deformed.

Seismic Slope Instability/Ground Cracking

Earthquake motions can induce substantial stresses in slopes, causing earthquake-induced landslides or ground cracking when the slope fails. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake triggered thousands of landslides over an area of 770 square miles.

Site Seismicity and Local Seismic Hazards

Table III.L-3 (Active Bay Area Faults) lists fault data for major faults within 30 miles of the Project site. The fault data shown in Table III.L-3 are based on the 2002 Revised California Fault Parameters by the CGS.[391] The closest fault to the Project site is the Peninsula branch of the San Andreas Fault, approximately 6.6 miles to the west.

Fault Rupture

No known active faults cross the Project site, making hazards from fault rupture unlikely. The Hunters Point Shear Zone, which crosses the HPS Phase II site in the northwest, is considered inactive, as is the City College Fault Zone about one mile southwest of Candlestick Point (refer to Figure III.L-1).[392]

- **Amplification**

Amplification effects can occur when seismic waves travel through soft soils underlain by shallow bedrock. During the design-level, site-specific seismic hazards assessment, appropriate attenuation relationships will be selected to account for amplification effects. All structures and improvements will be designed based on the appropriate seismic design parameters recommended in the seismic hazards assessment required by mitigation measure MM GE-4a.1.

[391] CGS, Revised California Seismic Shaking Analysis, Appendix A, 2002.
[392] Bonilla, 1998; CGS, 2000.

Table III.L-3 Active Bay Area Faults

Fault Name (Branch)	*Distance from miles (km)*	*Fault Length (km)*	*Maximum Earthquake Magnitude (M)*
San Andreas (Peninsula)	6.6 (10.7)	85	7.1
San Gregorio (North)	10.7 (17.2)	110	7.2
San Andreas (North Coast South)	10.8 (17.4)	190	7.4
Hayward (South)	12.0 (19.3)	53	6.7
Hayward (North)	12.4 (20.0)	35	6.4
Monte Vista—Shannon	21.3 (34.3)	45	6.7
Calaveras (North)	21.6 (34.7)	45	6.8
Rodgers Creek	25.2 (40.6)	62	7.0

SOURCE: California Geological Survey, 2002
M = Moment Magnitude, which is directly related to average fault slip and rupture area.

Liquefaction

Holocene-aged alluvial sediments are especially prone to liquefaction. The Project site is in an area of San Francisco that has been designated as potentially liquefiable. As depicted in Figure III.L-1, the majority of the Project site is covered by lowland soils and artificial fill, which is the most susceptible soil layer for liquefaction. The granular materials in the heterogeneous fill typically are loose and saturated beneath the shallow groundwater table, and may liquefy when subjected to groundshaking, resulting in loss of soil strength, settlement, and lateral spreading. Because of the heterogeneous nature of the fill, liquefaction is expected to occur in random layers and pockets, limiting the extent of seismically induced settlement and lateral spreading to localized zones within the fill. The hydraulically placed sand fill in the vicinity of the southeast-facing shoreline of Parcels D and E at HPS Phase II consists of a thick unit of predominantly uniform sand and is, therefore, more susceptible to liquefaction.

- Based on existing data, there is little or no risk of large translational movements.[393,394] Design-level liquefaction studies, which are further described in mitigation measures MM GE-5a, would address five general types of localized potential hazards, and provide treatment methods, including the following:
  - Potential foundation bearing failure, or large foundation settlements caused by ground softening and near-failure in bearing
  - Potential structural and/or site settlements
  - Localized lateral displacement; "lateral spreading" and/or lateral compression
  - Flotation of light structures with basements, or underground storage structures
  - Hazards to Lifelines (utilities critical to emergency response)

[393] ENGEO, 2009.
[394] Engineering/Remediation Resources Group, Inc. and Shaw Environmental, Inc., *Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard, San Francisco, California*, February 2009.

Lateral Spreading

Historical soil borings indicate that materials with the potential for lateral spreading are present in the artificial fill near the free face of the Yosemite Slough shoreline.[395] In addition, the area of hydraulically placed sand fill in the vicinity of the southeast-facing shoreline of Parcels D and E at HPS Phase II has higher than usual susceptibility to lateral spreading.

Earthquake-Induced Settlement

Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or Bay Mud. Seismically induced settlements at the Project site will vary considerably because of the heterogeneous nature of the fill. It is estimated that settlement between one to two percent of the zones susceptible to liquefaction, or approximately two to twelve inches, may occur at the site during strong groundshaking. If untreated, structures supported on shallow foundations in areas susceptible to settlement may experience one or more of the following:

- Damaging differential settlement, tilt and possibly be subject to localized bearing capacity failures
- Abrupt differential settlement between unimproved ground and pile-supported improvements
- Differential settlement of buried utilities and disruption of flow gradients
- Damage to non-flexible surface improvements

Treatments to correct settlement hazards are available using options described in mitigation measure MM GE-4. It is common to use several methods in combination to correct settlement hazards, depending on the magnitude of the geotechnical hazard present and the types of structures proposed. Where treatment would be necessary and implemented, total and differential seismic settlement would be reduced to acceptable levels for the types of structures and foundation support conditions encountered, as required by the *San Francisco Building Code*.

Sand Boils

Because of the heterogeneous nature of the fill, liquefaction is expected to occur in random layers and pockets on the Project site, limiting the extent of seismically induced sand boils to localized areas within the fill. The hydraulically placed sand fill in the vicinity of the southeast-facing shoreline of Parcels D and E at HPS Phase II consists of a thick unit of predominantly uniform sand and is, therefore, more susceptible to liquefaction. The mitigation measures to reduce liquefaction and other seismic hazards would also reduce the risk of formation or sand boils during a seismic event.

Ground Oscillation

During ground oscillation, the surface layer, riding on a buried liquefied layer, is thrown back and forth by the shaking and can be severely deformed. While the soils at the Project site have been identified as potentially liquefiable, there is no evidence of a broadly spanning buried liquefiable layer on which the surface layer could be oscillated. The mitigation measures to reduce liquefaction and other seismic hazards would also reduce the risk of damage to structures from deformation by ground oscillation during a seismic event.

[395] GTC, *Preliminary Foundation Report: Griffith Bridge and Walker Bridge*, Bayview Transportation Improvements Project, San Francisco, CA, 2008.

Seismic Slope Instability/Ground Cracking

Hazards associated with seismically induced mudslides, rockslides, or landslides are not anticipated because of the relatively flat topography of the Project site and the surrounding vicinity.[396]

III.L.3 Regulatory Framework

Protection of geologic resources and reduction of geologic hazards are governed by state and local jurisdictions. Seismic hazards are addressed by state and local requirements for identifying and avoiding faults and the effects of seismic groundshaking when considering new development. Federal standards, such as those promulgated through the National Earthquake Hazards Reduction Program (NEHRP), apply to new federally owned, constructed, or assisted buildings. The following acts, codes, and local plans are relevant to geologic and seismic issues in the Project site.

Federal

Executive Order 12699

Executive Order 12699, "Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction," was signed by President George H. W. Bush on January 5, 1990, to further the goals of Public Law 95-124, the *Earthquake Hazards Reduction Act of 1977*, as amended. The Executive Order applies to new construction of buildings owned, leased, constructed, assisted, or regulated by the federal government. Guidelines and procedures for implementing the order were prepared in 1992 by the federal Interagency Committee on Seismic Safety in Construction. The guidelines establish minimum acceptable seismic safety standards, provide evaluation procedures for determining the adequacy of local building codes, and recommend implementation procedures. Each federal agency is independently responsible for ensuring appropriate seismic design and construction standards are applied to new construction under its jurisdiction.[397]

Under the original Executive Order 12699, the model code for the West Coast was the Uniform Building Code developed by the International Conference of Building Officials (ICBO). In 1994, the ICBO joined with other similar organizations in the Southeast and on the East Coast to form the International Code Council (ICC). In 2000, the ICC published the first International Building Code (IBC) based on the reassessment of earlier codes and the combined updated experience of ICC member organizations. The current 2006 IBC is the result of nearly 100 years of building code improvement and forms the basis of the California and San Francisco building codes (discussed below), which are successively more stringent than the codes in force at the time of the implementation of the original federal guidelines.

[396] GTC, 2006.
[397] US Department of Commerce, Technology Administration, National Institute of Standards and Technology, *Guidelines and Procedures for Implementation of the Executive Order on Seismic Safety of New Building Construction*, NISTIR 4852, 1992, pp. 1 through 7.

State

Alquist-Priolo Earthquake Fault Zoning Act

Surface rupture is the most easily avoided seismic hazard. The *Alquist-Priolo Earthquake Fault Zoning Act* was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the State Geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and published maps showing these zones. Buildings for human occupancy are not permitted to be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace, because many active faults are complex and consist of more than one branch. There is the potential for ground surface rupture along any of the branches. The Project site is not in an Alquist-Priolo Earthquake Fault Zone. Therefore, the Project would not be subject to this Act.

Seismic Hazard Mapping Act

The state regulations protecting the public from geo-seismic hazards, other than surface faulting, are contained in California *Public Resources Code* Division 2, Chapter 7.8 (the *Seismic Hazards Mapping Act*), described here, and 2007 *California Code of Regulations* (CCR), Title 24, Part 2 (the *California Building Code* [CBC]), described below. Both of these regulations apply to public buildings, and a large percentage of private buildings, intended for human occupancy.

The *Seismic Hazard Mapping Act* was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes. The Act directs the CGS to identify and map areas prone to the earthquake hazards of liquefaction, earthquake-induced landslides, and amplified groundshaking. The Act requires site-specific geotechnical investigations to identify potential seismic hazards and formulate corrective measures prior to permitting most developments designed for human occupancy within the Zones of Required Investigation.

As of February 2009, 117 official seismic hazard zone maps showing areas prone to liquefaction and landslides had been published in California, and more are scheduled for 2010. The mapping is being performed in Southern California and San Francisco Bay Area. Twenty-seven official maps for San Francisco Bay Area have been released, with preparation of additional maps for San Mateo, Santa Clara, Alameda, and Contra Costa Counties planned or in progress. The Project site is on the Seismic Hazard Map for the City and County of San Francisco (Hunters Point Quadrangle), published in November 2001, and shows approximately 90 percent of the Project site to be in a Zone of Required Investigation for liquefaction potential. Although past earthquakes have caused ground failures in only a small percentage of the total area in mapped hazard zones, a worst-case scenario of a major earthquake during or shortly after a period of heavy rainfall has not occurred in Northern California since 1906.[398]

Section 2697 of the Seismic Hazards Mapping Act mandates that, prior to the approval of a project in a seismic hazard zone, the City must require the preparation of a geotechnical report defining and delineating any seismic hazard. CGS has published Special Publication 117A, *Guidelines for Evaluating and Mitigating*

[398] California Geological Survey, *Guidelines for Evaluating and Mitigating Seismic Hazards in California*, CGS Special Publication 117A, 2008, p. 9.

Seismic Hazards in California, to assist the engineering geologist and/or civil engineer who must investigate the site and recommend mitigation of identified earthquake-related hazards and to promote uniform and effective statewide implementation of the evaluation and mitigation elements of the Seismic Hazards Mapping Act. Under the act, the San Francisco Department of Building Inspection (DBI), the local permitting authority, must regulate certain development projects within the mapped hazard zones. For projects in a hazard zone, DBI requires that the geologic and soil conditions of the Project site are investigated and appropriate mitigation measures, if any, incorporated into development plans. "Mitigation" is defined as those measures that are consistent with established practice and reduce seismic risk to acceptable levels.[399] "Acceptable level" of risk is defined as that level that provides reasonable protection of public safety, although it does not necessarily ensure continued structural integrity and functionality of a building.[400] Based on the above definitions of mitigation and acceptable risk, the *Seismic Hazards Mapping Act* and related regulations establish a statewide minimum public safety standard for mitigation of earthquake hazards. That standard is the minimum level of mitigation for a project that would reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but in most cases, not to a level at which no ground failure would occur.

The Act and associated regulations state that the site-investigation reports must be reviewed by a certified engineering geologist or registered civil engineer with competence in the field of seismic hazard evaluation and mitigation. As required by the mitigation measures herein, DBI would employ a third-party engineering geologist and/or civil engineer to form a Geotechnical Peer Review Committee (GPRC) which would complete the technical review. After a site investigation report was approved, subsequent site investigation reports would not be required, provided that new geologic information warranting further investigation was not recorded. The *San Francisco Building Code* requires that the recommendations of the report be incorporated in the building design.

The City is required to submit one copy of the approved site investigation report to the State Geologist within 30 days of approval. If the City approves a project that is not in accordance with the policies and criteria of the *Seismic Hazards Mapping Act*, the City is required to explain in writing the reasons for the differences to the State Geologist, within 30 days of the project's approval. The site-specific geotechnical investigation may refine the State's areawide interpretations. If the new documentation supports the site-specific interpretation, the State Geologist would file the report as an amendment to the Seismic Hazard Evaluation for the appropriate United States Geological Survey (USGS) topographic quadrangle map.

[399] *Public Resources Code*, Section 2693(c).
[400] *California Code of Regulations,* Title 14, Section 3721(a).

Caltrans Bridge Design Specifications and San Francisco Department of Public Works Standard Specifications

State guidelines protecting bridges and overpasses on state roads from geologic and seismic hazards are contained in Caltrans *Bridge Design Specifications*,[401] *Bridge Memo to Designers*,[402] *Bridge Design Practice Manual*,[403] and *Bridge Design Aids Manual*.[404] The manuals provide state-of-the-art information to address geo-seismic issues that affect the design of transportation infrastructure in California. Bridge design is required to be based on the "Load Factor Design methodology with HS20-44 live loading (a procedure to incorporate the estimated weight of the vehicles and/or pedestrians on the bridge with the weight of the bridge for loading calculations)" in the *Bridge Design Specifications*. Seismic-resistant design is required to conform to the *Bridge Design Specifications* and Section 20 of *Bridge Memo to Designers*, as well as Caltrans *Seismic Design Criteria*.[405] Section 20 of *Bridge Memo to Designers* outlines the category and classification, seismic performance criteria, seismic design philosophy and approach, seismic demands and capacities on structural components, and seismic design practices that collectively make up Caltrans' seismic design methodology. The methodology applies to all bridges and highways designed in California. A bridge's category and classification determines its seismic performance level and which methods would be used to estimate the seismic demands and structural capacities. The performance criteria include functional and safety evaluations of ground motion, level of service to be attained following a major earthquake, and the level of damage the structure must be designed to withstand.

The Caltrans *Seismic Design Criteria* specify the minimum seismic design requirements that are necessary to meet the performance goals established in Section 20 of *Bridge Memo to Designers*. Each bridge presents a unique set of design challenges and the *Seismic Design Criteria* provide guidelines to determine the appropriate methods and level of refinement necessary to design and analyze each bridge on a case-by-case basis. The Caltrans Offices of Structures Design provide the bridge designer with resources to establish the correct course of action and Senior Seismic Specialists, an Earthquake Committee, and an Earthquake Engineering Office of Structure Design Services and Earthquake Engineering to peer-review proposed methods and provide further recommendations.

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[401] California Department of Transport (Caltrans), Division of Engineering Services, *Bridge Design Specifications*, 2009. http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-design-specifications/bds.html, last updated November 7, 2008 (accessed June 17, 2009).

[402] Caltrans, Division of Engineering Services, *Bridge Memo to Designers*, 2009. http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-memo-to-designer/bmd.html, last updated March 3, 2009 (accessed June 17, 2009).

[403] Caltrans, Division of Engineering Services, *Bridge Design Practice Manual*, 2009. http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-design-practice/bdp.htm>, last updated November 7, 2007 (accessed June 17, 2009).

[404] Caltrans, Division of Engineering Services, *Bridge Design Aids Manual*, 2009. http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-design-aids/bda.htm>, last updated April 17, 2009 (accessed June 17, 2009).

[405] Caltrans, Division of Engineering Services, *Seismic Design Criteria, version 1.4*, 2009. http://www.dot.ca.gov/hq/esc/techpubs/manual/othermanual/other-engin-manual/seismic-design-criteria/sdc.htm>, last updated August 7, 2008 (accessed June 17, 2009).

The San Francisco Department of Public Works Bureau of Engineering (BOE) Standard Specifications for Streets and Highways,[406] and for Structures[407] are based on the Caltrans design specifications and provide detailed information regarding materials and procedures for road and bridge construction in the City. The BOE provides design and inspection services for City streets, infrastructure, and structures. During the construction phase, BOE would be responsible for assuring that the Project would be consistent with applicable codes, standards, and principles as implemented by the Project contractor.

California Building Code and the San Francisco Building Code

Until January 1, 2008, the *California Building Code* (CBC) was based on the then current *Uniform Building Code* and contained Additions, Amendments and Repeals specific to building conditions and structural requirements in California. The 2007 CBC, effective January 1, 2008, is based on the current (2006) *International Building Code* (IBC).[408] Each jurisdiction in California may adopt its own building code based on the 2007 CBC. Local codes are permitted to be more stringent than Title 24, but, at a minimum, are required to meet all state standards and enforce the regulations of the 2007 CBC beginning January 1, 2008.

San Francisco adopted the 2007 CBC as the basis for its Building Code (*Municipal Code* Title 17, Chapter 17.04) through Ordinance No. 3789, on December 3, 2007. The full 2007 San Francisco Building Code (SFBC) consists of the 2006 IBC, as amended by the 2007 CBC, and as further modified by San Francisco amendments designed to be used in conjunction with the 2007 CBC. The SFBC amendments were adopted by the Board of Supervisors on November 6, 2007, through Ordinance 258-07, effective January 1, 2008.

Chapter 16 of the SFBC deals with structural design requirements governing seismically resistant construction (Section 1604), including (but not limited to) factors and coefficients used to establish seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design (Sections 1613.5 and 1613.6). Chapter 18 of the SFBC includes (but is not limited to) the requirements for foundation and soil investigations (Section 1802); excavation, grading, and fill (Section 1803); allowable load-bearing values of soils (Section 1804); and the design of footings, foundations, and slope clearances (Section 1805), retaining walls (Section 1806), and pier, pile, driven, and cast-in-place foundation support systems (Section 1808, 1809 & 1810). Chapter 33 of the SFBC includes (but is not limited to) requirements for safeguards at work sites to ensure stable excavations and cut or fill slopes (Section 3304). Appendix J of the SFBC includes (but is not limited to) grading requirements for the design of excavations and fills (Sections J103 through J107) and for erosion control (Sections J109 & J110).

Compliance with the SFBC is mandatory for development in San Francisco. Throughout the permitting, design, and construction phases of a building project, Planning Department staff, DBI engineers, and DBI building inspectors confirm that the SFBC is being implemented by project architects, engineers, and contractors.

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[406] San Francisco Department of Public Works' Bureau of Engineering, *Standard Specifications—Part 2, Streets and Highways*. http://www.sfgov.org/site/uploadedfiles/sfdpw/boe/ Part2-StreetsAndHighways.pdf, 2000-09, last updated not provided (accessed June 17, 2009).

[407] San Francisco Department of Public Works' Bureau of Engineering, *Standard Specifications—Part 4, Structures*. http://www.sfgov.org/site/uploadedfiles/sfdpw/boe/Part4-Structures.pdf, 2000-09, last updated not provided (accessed June 17, 2009).

[408] California Building Standards Commission, *2007 California Building Code*, California Code of Regulations, Title 24, Part 2, Volumes 1 and 2, effective January 1, 2008.

During the design phase for buildings in the Project, foundation support and structural specifications based on the preliminary foundation investigations would be prepared by the Project engineer and architect and would be reviewed for compliance with the SFBC by the Planning Department and DBI.

During the Project construction phase, DBI inspectors would be responsible for enforcing the provisions of the SFBC as implemented by the contractor.

San Francisco General Plan

The City of San Francisco *General Plan* (1996) provides long-term guidance and policies maintaining and improving the quality of life and the man-made and natural resources of the community. The Community Safety Element includes policies for the avoidance of geologic hazards and/or the protection of unique geologic features. The plan requires detailed site-specific geologic hazard assessments in areas delineated with geologic hazards (seismic hazards, landslides, and liquefaction). Filled land and geologic hazards, such as landslides and shoreline erosion, are addressed in the Environmental Protection Element of the City of San Francisco *General Plan*. The Element includes policies for the promotion of the highest standards of soils engineering, the correction of landslide and shore erosion conditions, and the avoidance of construction on land subject to slide or erosion.

San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission (BCDC) is a federally designated state coastal management agency for San Francisco Bay. Bay shoreline construction projects, such as filling or dredging in the Bay, certain tributaries to the Bay, salt ponds, and managed wetlands around the Bay, or grading within 100 feet of the Bay shoreline, require permit approval from the BCDC. The BCDC issues an Administrative Permit for minor repairs or improvements along the Bay shoreline and a Major Permit for more extensive projects along the Bay shoreline. The Project would involve the construction of a marina, a bridge across Yosemite Slough, and various shoreline improvements. Such activities would require a permit from BCDC.

In accordance with *McAteer-Petris Act of 1965*, the BCDC is responsible for maintaining and carrying out the policies of the *San Francisco Bay Plan* (Bay Plan). The Bay Plan, adopted in 1969 and more recently amended in 2008, specifies goals, objectives and policies for existing and proposed waterfront land uses use and other BCDC jurisdictions areas. Part III of the Bay Plan contains findings and policies pertinent to the development of the Project.

III.L.4 Impacts

■ Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to geology and soils, but generally consider that implementation of the Project would have significant impacts if it were to:

L.a Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on

other substantial evidence of a known fault (refer to California Geological Survey Special Publication 42)

ii. Strong seismic groundshaking

iii. Seismic-related ground failure, including liquefaction

iv. Landslides

L.b Result in substantial soil erosion or the loss of topsoil

L.c Be located on a geologic or soil unit that is unstable, or that would become unstable as a result of the Project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse

L.d Be located on expansive soil, as defined in Section 1802.3.2 of the 2007 SFBC, creating substantial risks to life or property

L.e Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater

L.f Change substantially the topography or any unique geologic or physical features of the site

Analytic Method

Preliminary geotechnical assessment of the Project site, including both Candlestick Point and HPS Phase II, has been completed by ENGEO for the Applicant.[409] PBS&J staff have peer-reviewed all ENGEO reports. The preliminary geotechnical assessment was based on previous site-specific geotechnical and hazardous material investigations, some of which include subsurface borings, and review of published geologic reports and maps. The preliminary geotechnical assessment report provides a summary and compilation of available geotechnical information that has been used as part of the analysis of geologic, seismic, and geotechnical issues for this EIR.

This preliminary geotechnical assessment is the first step in identifying, evaluating, and addressing the geotechnical conditions on the Project site and provides necessary information and recommendations to support Project planning and conceptual-level design. Site-specific, design-level geotechnical studies would be completed on a parcel-by-parcel basis during development of construction plans for Project infrastructure and buildings.[410] During the final design, development of individual blocks and foundation recommendations, which may involve further geotechnical exploration, would be required. For high-rise structures, a unique foundation recommendation report would be required for each building.

The Project would develop residential uses, commercial space, office and research and development space, civic and community uses, open space, a marina, and a new 49ers Stadium. Project structures would be designed in accordance with the current SFBC, and would be based on design criteria resulting from required evaluation of site-specific geologic and seismic hazards, including potential for fault rupture, ground motions generated by earthquakes (groundshaking), slope instability, liquefaction, lateral spreading, settlement, and loss of soil strength. In addition to evaluating potential long-term or operational impacts from seismic hazards, potentially corrosive soils, or expansive soils, this section also analyzes short-term soils impacts that could occur during construction, such as erosion and local slope instability. With regard

[409] ENGEO, Inc., *Preliminary Geotechnical Conceptual Design Report Hunters Point Shipyard Phase II and Candlestick Point, San Francisco, California*, May, 2009.
[410] ENGEO, 2009.

to the marina component of the Project, the analysis in this section considers the landside improvements (which could include parking, restroom facilities, a classroom to teach sailing, and a harbormaster's office) that could be affected by geologic hazards, and shoreline modifications that would be needed to accommodate the gangways and extension of utility infrastructure.

The analysis includes review of regional and local geologic maps and reports, as well as Project-specific geologic and geotechnical reports to identify geologic conditions and geologic hazards in the Project site that, because of their proximity, could be directly or indirectly affected by the Project or affect the Project itself. The overall geotechnical and soil conditions across the Project site are similar. To determine potential effects of the Project that relate to geologic hazards during construction and operation, this section analyzes the Project site with respect to identified geological hazards, such as landslides, unstable slopes, liquefaction hazards, and active faults.

Table III.L-4 (Summary of Geologic Conditions, Design Details, and Treatments) through Table III.L-8 (Geotechnical Treatment for HPS Phase II Geotechnical Subparcels) summarize the geological and geotechnical information compiled by ENGEO for the portions of the Project site proposed for construction of physical facilities related to the uses listed above. Table III.L-4 summarizes the geological conditions, design details, and treatments available for the Project site. Table III.L-5 (Grading and Fill Conditions for Candlestick Point Geotechnical Subparcels) and Table III.L-6 (Grading and Fill Conditions for HPS Phase II Geotechnical Subparcels) provide the grading and fill conditions for the geotechnical subparcels. Table III.L-7 (Geotechnical Treatments for Candlestick Point Subparcels) and Table III.L-8 (Geotechnical Treatments for HPS Phase II Subparcels) provide the geotechnical treatments and foundation types for structures in each geotechnical subparcel. Figure III.L-4 (Geotechnical Subparcels) shows the location and boundaries of the geotechnical subparcels and illustrates the relationship of the Project's districts to the geotechnical subparcels identified in Table III.L-5 and Table III.L-6.

Table III.L-4 Summary of Geologic Conditions, Design Details, and Treatments

Districts	*Candlestick Point*	*HPS Phase II*
Geologic Conditions	Artificial Fill thickness up to 70 ft; Bay Mud thickness up to 70 ft; Bedrock elevations range from -220 to + 150 ft (SFCD; Groundwater elevations range from -3 to -9 ft (SFCD)	Artificial Fill thickness up to 50 ft; Bay Mud thickness up to 40 ft; Bedrock elevations range from -200 to +50 ft (SFCD); Groundwater elevations range from -1 to -15 ft (SFCD)
Design Details	Low-rise residential, mid- and high-rise towers with below grade parking, low- and mid-rise commercial; bridge and roadway corridor	Low-rise and mid-rise residential, low- to mid-rise mixed-use, and commercial; high-rise towers; sports facility and parking, utility corridor
Treatments	Mat, spread footing and deep foundations; foundation selection on pad-by-pad basis; depth of foundations determined during design level study; some remedial grading and placement of geogrid; some surcharging; and some overexcavation for utilities	Mat and deep foundations; foundation selection on pad-by-pad basis; depth of foundations determined during design level study; some remedial grading; and some overexcavation for utilities

SOURCE: ENGEO, April 2009

Table III.L-5 Grading and Fill Conditions for Candlestick Point Geotechnical Subparcels

Districts	*Geotech Subparcel*	*Existing Grades*	*Proposed Grading*	*Artificial Fill*
Candlestick Point North	H	Varies from -5 ft to +7 ft (CCSF)	Cuts up to 4 ft; Fills up to 9 ft	Bottom of artificial fill ranges from elevation -10 ft to -40 ft; thickness ranges from 20 ft to 50 ft
Alice Griffith	G1	Varies from 0 to +15 ft (CCSF)	Cuts up to 23 ft; Fills up to 13 ft	Bottom of artificial fill ranges from elevation -10 to -20 ft; thickness of up to 30 ft
	G2	Varies from +10 to +45 ft (CCSF)	Fills up to 7 ft	Bottom of artificial fill extends to elevation -10 ft; thickness of up to 20 ft
Jamestown Avenue	J	Varies from +113 to +150 ft (CCSF)	Cuts up to 33 ft	n/a
Candlestick Point Center	K1	Varies from +4 to +50 ft (CCSF)	Cuts up to 40 ft; Fills up to 5 ft	n/a
	K2	Varies from +1 to +25 ft (CCSF)	Cuts up to 4 ft; Fills up to 4 ft	Bottom of artificial fill extends to elevation -50 ft; thickness of up to 40 ft
Candlestick Point South	L1	Varies from +5 to -5 ft (CCSF)	Cuts up to 8 ft; Fills up to 10 ft	Bottom of artificial fill ranges from elevation -10 ft to up to -70; thickness ranges from 10 ft to 70 ft
	L2	Varies from -2 to +6 ft (CCSF)	Cuts up to 2 ft; Fills up to 6 ft	Bottom of artificial fill ranges from elevation -10 ft to -50 ft; thickness ranges from 15 ft to 40 ft
Yosemite Slough bridge	YB	Varies from -3 to +6 ft (CCSF)	Cuts up to 8 ft; Fills up to 10 ft	Bottom of artificial fill ranges from elevation -10 ft to -20 ft; thickness ranges from 10 to 20 ft

SOURCE: ENGEO, April 2009.
For location of Geotechnical Parcels, refer to Figure III.L-4 (Geotechnical Subparcels)

Table III.L-6 Grading and Fill Conditions for HPS Phase II Geotechnical Subparcels

Districts	*Geotech Subparcel*	*Existing Grades*	*Proposed Grading*	*Artificial Fill*	*Young Bay Mud*	*Depth to Bedrock*
Hunters Point North and Hunters Point Village Center	B1 (includes Hunters Point Village Center)	Majority of the site varies from 0 to +5 ft elevation; increases to 35 ft along the southwestern boundary	Cuts up to 14 ft; Fills up to 24 ft	Bottom of artificial fill ranges from elevation 0 ft to -25 ft; thickness ranges from up to 25 ft	Bottom of Bay Mud ranges from elevation -15 ft to -25 ft; thickness less than 10 ft	Bedrock at surface within higher portion of site and extends to elevation -60 ft beneath fill
	B2	Varies from 0 to +3 ft elevation	Fills up to 2 ft	Bottom of artificial fill ranges from elevation -10 to -85 ft; thickness ranges from 10 ft to 85 ft	Bottom of Bay Mud ranges from elevation -5 ft to -25 ft; thickness of up to 10 ft	Top of bedrock located between elevation -10 ft and -80 ft
	B3	Varies from +1.5 to +20 ft elevation	Fills up to 2 ft	Bottom of artificial fill ranges from elevation +10 ft to -35 ft; thickness of up to 35 ft	Bottom of Bay Mud ranges from elevation -30 ft to -40 ft; thickness of up to 10 ft	Top of bedrock located between elevation -20 ft and -40 ft

Table III.L-6 Grading and Fill Conditions for HPS Phase II Geotechnical Subparcels

Districts	*Geotech Subparcel*	*Existing Grades*	*Proposed Grading*	*Artificial Fill*	*Young Bay Mud*	*Depth to Bedrock*
Research and Development	C1	Varies from 0 to +3 ft elevation	Fills up to 4 ft	Bottom of artificial fill ranges from elevation 0 ft to -15 ft; thickness of up to 20 ft	Bottom of Bay Mud ranges from elevation -5 ft to -25 ft; thickness of up to 10 ft	Top of bedrock located between elevation +10 ft and -25 ft.
	C2	Varies from -1 to +2 ft elevation	Fills up to 4 ft	Bottom of artificial fill ranges from elevation -5 ft to -30 ft; thickness ranges from 5 ft to 30 ft	Bottom of Bay Mud ranges from elevation -15 ft to -30 ft; thickness of up to 10 ft	Top of bedrock located between elevation -5 ft and -30 ft
Hunters Point South	Stadium	Varies from -2.5 to +1.5 ft elevation	Fills up to 9 ft	Bottom of artificial fill ranges from elevation 0 ft to -40 ft; thickness of up to 40 ft	Bottom of Bay Mud ranges from elevation -15 ft to -50 ft; thickness of up to 10 ft	Top of bedrock located between elevation 0 ft and -50 ft
	Parking	Varies from -4 to +3 ft elevation	Fills up to 12 ft	Bottom of artificial fill ranges from elevation 0 to -50 ft; thickness of up to 50 ft	Bottom of Bay Mud ranges from elevation -20 ft to -60 ft; thickness of up to 50 ft	Top of bedrock located between elevation 0 ft and -200 ft
Roadways	UC1	Varies from 0 to +3 ft elevation	Fills up to 5 ft	Bottom of artificial fill ranges from elevation +30 ft to +5 ft; thickness of up to 5 ft	n/a	Depth to bedrock generally less than 5 ft
	UC2	Varies from 0 to +15 ft elevation	Fills up to 10 ft	Bottom of artificial fill ranges from elevation +10 ft to 0 ft; thickness of up to 5 ft	n/a	Depth to bedrock generally less than 5 ft
	UC3	Varies from +20 to +54 ft elevation	Cuts up to 1 ft; Fills up to 24 ft	Bottom of artificial fill ranges from elevation +5 ft to -5 ft; thickness of up to 5 ft	n/a	Depth to bedrock generally less than 5 ft

SOURCE: ENGEO, April 2009
All elevations shown in SFCD
For location of Geotechnical Parcels, refer to Figure III.L-4 (Geotechnical Subparcels).

Table III.L-7 Geotechnical Treatments for Candlestick Point Geotechnical Subparcels

Subareas	*Geotech Subparcel*	*Development Type*	*Proposed Geotechnical Remediation*	*Proposed Foundations*
Candlestick Point North	H	Low-rise residential structures with basement parking level (10 ft deep). Mid-rise and high-rise towers on podium with basement (10 ft deep).	Remove and recompact undocumented fill within 5 feet of finish grade. Placement of geogrid below shallow foundations. Possible surcharging in select areas.	Low-rise structures supported on structural mat. Mid-rise structures will vary from shallow to deep foundations to be determined on a pad-by-pad basis. High-rise structures on deep foundations.
Alice Griffith	G1	Low-rise residential structures constructed at grade.	Remove and recompact undocumented fill within 5 feet of finish grade. Placement of geogrid below shallow foundations.	Low-rise structures supported on structural mat.
	G2	Low-rise residential structures constructed at grade.	Remove and recompact undocumented fill within 5 feet of finish grade.	Low-rise structures supported on shallow foundation on bedrock or shallow engineered fill.
Jamestown Ave.	J	Mid-rise residential structures constructed at grade.	Remove and recompact undocumented fill within 5 feet of finish grade.	Mid-rise structures supported on shallow foundation on bedrock or shallow engineered fill.
Candlestick Point Center	K1	Mid-rise commercial structures constructed at grade.	Remove and recompact undocumented fill within 5 feet of finish grade.	Mid-rise structures supported on shallow foundation on bedrock or shallow engineered fill.
	K2	Mid-rise commercial structures constructed at grade.	Remove and recompact undocumented fill within 5 feet of finish grade.	Mid-rise structures will vary from shallow to deep foundations to be determined on a pad-by-pad basis.
Candlestick Point South	L1	Low-rise residential with ½ basement (5 ft deep) parking level. One high-rise building located mid-parcel along western boundary.	Remove and recompact undocumented fill within 5 feet of finish grade. Placement of geogrid below shallow foundations. Surcharging over entire parcel.	Low-rise structures supported on structural mat. High-rise structures supported on deep foundations.
	L2	Mid-rise mixed-use structures constructed at grade.	Remove and recompact undocumented fill within 5 feet of finish grade.	Mid-rise structures supported on deep foundations.
Yosemite Slough Bridge	YB	Bridge and roadway corridor	Remove and recompact undocumented fill within 5 feet of finish grade. Placement of geogrid below roadway and approach.	Bridge structure supported on deep foundations.

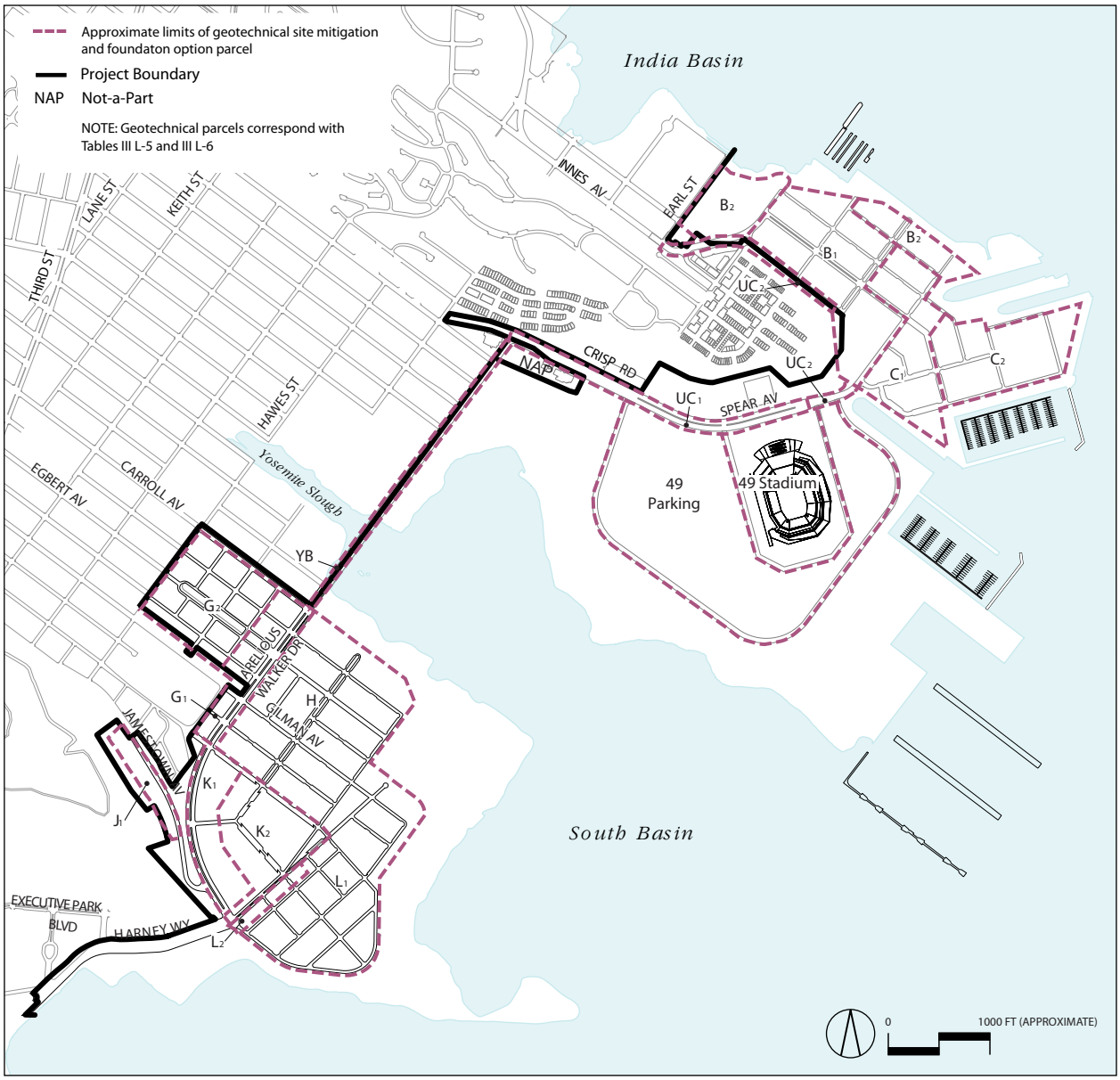
SOURCE: ENGEO, May 2009

Table III.L-8 Geotechnical Treatment for HPS Phase II Geotechnical Subparcels

Subareas	*Geotech Subparcel*	*Development Type*	*Proposed Geotechnical Remediation*	*Proposed Foundations*
Hunters Point and Hunters Point Village Center (Parcel B)	B1 (Includes Hunters Point Village Center)	Low-rise and mid-rise residential and mid-rise mix-use structures constructed at grade	Remove and recompact undocumented fill within 5 feet of finish grade. Placement of geogrid below shallow foundations.	Low-rise structures supported on structural mat. Mid-rise structures supported on deep foundations.
	B2	Low-rise residential with one high-rise building at the east corner constructed at grade	Remove and recompact undocumented fill within 5 feet of finish grade.	Structures supported on deep foundations founded in competent material.
	B3	Park/open space and surface water treatment facilities constructed at grade	No remedial measures planned.	No structures proposed.
Research and Development (Parcel C)	C1	Mid-rise commercial structures constructed at grade	Remove and recompact undocumented fill within 5 feet of finish grade. Placement of geogrid below shallow foundations.	Low-rise structures supported on structural mat. Mid-rise structures will vary from shallow to deep foundations to be determined on a pad-by-pad basis.
	C2	Mid-rise commercial structures constructed at grade	Remove and recompact undocumented fill within 5 feet of finish grade.	Structures supported on deep foundations founded in competent material.
Stadium (Parcel D and E)	Stadium	Professional level sport facility with playing field	Remove and recompact undocumented fill within 5 feet of finish grade.	Structures supported on deep foundations founded in competent material.
	Parking	Turf area for stadium parking capable of supporting recreation	Gravity utilities designed for on-going settlement.	No structures proposed.
Roadways	UC1	Utility corridor	No remedial measures planned.	No structures proposed.
	UC2	Utility corridor and traffic thoroughfare	No remedial measures planned.	No structures proposed.
	UC3	Utility corridor and traffic thoroughfare	No remedial measures planned.	No structures proposed.

SOURCE: ENGEO, May 2009

Table III.L-9 (Summary of Waterfront Structures Field Investigative Observations) summarizes the condition of the existing structures along the area that would become waterfront open space with implementation of the Project. Table III.L-10 (Overview of Waterfront Structures Construction Activities) indicates the work proposed (demolition, repair, fill, and/or construction) to turn the shoreline areas into stable open space. Marina facilities including a floating dock system with guide piles and vessel berths, concrete sheet pile breakwaters supported by batter piles, steel dolphin piles with floating donut-type fenders, and landside marina-serving facilities and utilities (dock abutment, parking lot, restrooms, sewage pump-out, harbormaster office) would be constructed in the open space. Shoreline stabilization treatments would include grading and filling to raise the ground surface, rock slopes and buttresses for protection for portions of the shoreline, and timber cribs to support the remaining piers and wharves. Figure III.L-4



SOURCE: Engeo, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

GEOTECHNICAL SUBPARCELS

FIGURE III.L-4

shows the shoreline areas outside the geotechnical subparcels (but within the Project boundaries) that would become open space.

Table III.L-9 Summary of Waterfront Structures Field Investigative Observations

Facility	*Condition Rating*	*General Comments*
Wharf at Berth 55 to 61 (Parcel B)	Fair	Concrete structural elements appear to be sound. Minor spalling
Drydocks 2 and 3 (Parcel C)	Poor	Vertical cracks extending full height of walls, air pockets have expanded into large voids.
Berths 1 and 2 (Parcel C)	Serious	Advanced deterioration, deck edge spalling, exposed rebar, pile cracking, apparent collision/impact damage, broken concrete support elbows.
Berth 3 and 4 (Parcel C)	Poor	Advanced deterioration, frequent spalls and corrosion cracks, some exposed corroded rebar.
	Poor to Serious Sta. 10+60 to south edge of pile supported Berth 2 (U/W)	Advanced deterioration, open corrosion spalls with exposed rebar, spalls 6 inches deep.
Berth 5 (Parcel C)	Poor	Advanced open corrosion spalling, impact spalls, cracks and delaminations spalls up to approx. 100 sq. ft.
Berths 6 and 7 (Parcel C)	Poor	Advanced deterioration, open corrosion spalling, cracking on 20% or more walls, 1 to 10 sq. ft. spalls.
Berths 8 and 9	Poor	Advanced corrosion spalling, cracking, and delamination of 20% or more for walls, vertical spalls along cold joints.
Drydock 4 (Parcel C)	Poor	Advanced deterioration, more than 40% has patches of open and closed corrosion spalls and consistent delaminations (full height).
Berth 10 (Parcel D)	Poor	Open corrosion spalls and cracks along 20% or more of the wall. Exposed rebar along damages below caping.
Berth 11 (Parcel D)	Serious	Advanced deterioration and broken concrete throughout majority of wall. Open corrosion spalls and cracks.
Berths 12 and 13 (Parcel D)	Poor	Advanced deterioration along 25% or more; open corrosion spalls and delamination patches; exposed rebar, corrosion cracks along walls.
Berth 14 (Parcel D)	Poor	More than 30% of concrete wall has damages; spalls, exposed and corroded rebar; patches of delaminations and open corrosion spalls at the caping. Spalling at vertical cold joints.
Berths 15–22 and 29 (Parcel D)	Serious	Top 2 ft has 50% to 100% section loss; gaps found between steel sheets. Majority of concrete cap is spalled and exposed rebar. Damage at Berth 29 suspected to be caused by impact.

SOURCE: Moffatt & Nichol, August 2009

Table III.L-10 Overview of Waterfront Structures Construction Activities

Parcel	*Demolish and Remove*		*Repair*	*Construction*
B	—		Concrete, Steel	Buttress
C	Timber Cribbing Structure, Concrete	Miscellaneous Fill	Concrete, Steel	Rock slopes, Buttress, Sheet Pile Wall
D	Timber Cribbing Structure, Cellular Sheet Pile Wall, Miscellaneous	Concrete Steel Fill	Concrete, Steel	Rock slopes, Buttress
E	Cellular Sheet Pile Wall, Concrete	Miscellaneous Fill	Steel	Rock slopes, Buttress, Revetment
E-2				Mudflatt
CSP	Miscellaneous Fill		—	Beach, Marsh, Revetment

SOURCE: Moffatt & Nichol, August 2009

Construction Impacts

Impact GE-1: Soil Erosion

Impact of Candlestick Point

Impact GE-1a **Construction at Candlestick Point, including the Yosemite Slough bridge, would not result in the loss of topsoil caused by soil erosion. (Less than Significant with Mitigation) *[Criterion L.b]***

Construction activities in the Candlestick Point site, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Candlestick Point site is slight to severe.

Requirements to control surface soil erosion during and after construction at Candlestick Point would be implemented with mitigation measure MM HY-1a.1. The requirements of this mitigation measure are described under Impact HY-1a in Section III.M (Hydrology and Water Quality) and include implementation of a Stormwater Pollution Prevention Plan (SWPPP) and use of best management practices (BMPs) for construction sites. Mitigation measure MM HY-1a.1 would require preparation of a SWPPP and would be required to identify the specific measures and BMPs that are applicable to Candlestick Point construction activities. Installation of erosion mitigation measures would be the responsibility of the Project contractor and would be monitored by DBI inspectors for compliance with the SFBC requirements. Adherence to these requirements through the implementation of standard BMPs for the control of erosion during construction would include a variety of techniques that would be implemented based on site-specific conditions and could include plastic covers and erosion control blankets, soil binders, silt fencing, straw bales, wood mulch, and drainage ditches. Erosion controls could include performing construction activities in the dry season, and minimizing removal of, and damage to native vegetation. To control an increase in dust during construction activities, disturbed areas could be sprayed with water, or a non-toxic soil stabilizer. (Also refer to Section III.H (Air Quality) regarding construction dust control measures.)

Construction activities for the Yosemite Slough bridge, such as grading and excavation of the bridge approaches, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Candlestick Point site is slight to severe.

With implementation of mitigation measure MM HY-1a.1, adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to less-than-significant levels.

Impact of Hunters Point Shipyard Phase II

Impact GE-1b **Construction at HPS Phase II would not result in the loss of topsoil caused by soil erosion. (Less than Significant with Mitigation) *[Criterion L.b]***

The potential for exposure to adverse effects caused by soil erosion in the HPS Phase II site exists. Construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the HPS Phase II site is slight to severe.

Requirements to control surface soil erosion during and after construction at HPS Phase II would be implemented through the requirements of mitigation measure MM HY-1a.1 and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to less-than-significant levels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-1 **Construction activities associated with the Project would not result in the loss of topsoil caused by soil erosion. (Less than Significant with Mitigation) *[Criterion L.b]***

Construction activities, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. Requirements to control surface soil erosion during and after construction associated with the Project would be implemented through the requirements of mitigation measure MM HY-1a.1 and adverse effects on the soil such as soil loss from wind erosion and stormwater runoff would be avoided or reduced to a less-than-significant level.

Impact GE-2: Settlement from Dewatering Activities

Impact of Candlestick Point

Impact GE-2a **Construction at Candlestick Point and the Yosemite Slough bridge would not result in damage to structures from settlement caused by lowering of groundwater levels. (Less than Significant with Mitigation) *[Criterion L.c]***

At Candlestick Point, construction activities would have the potential to affect groundwater levels. Project construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. Groundwater levels in the artificial fill and the underlying estuarine deposits at Candlestick Point generally are less than 15 feet below the ground surface and experience varying degrees of tidal fluctuation. Some minor dewatering may be needed to reduce heads to several feet or more below excavation bottoms and to address seepage and the potential for settlement. Dewatering during construction activities could cause settlement of adjacent soils; however, since there are no existing structures at Candlestick Point that will remain with the Project, no damage to overlying foundations of existing buildings would result.

Construction activities for the Yosemite Slough bridge would have the potential to affect groundwater levels. Project construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. Groundwater levels in the artificial fill and the underlying estuarine deposits near Yosemite Slough are generally less than 15 feet below the ground surface and experience varying degrees of tidal fluctuation. Some minor dewatering may be needed to reduce heads to several feet or more below excavation bottoms and to address seepage and the potential for settlement. However, as there are no structures adjacent to the location of the proposed bridge, dewatering during construction would not affect foundations of existing structures.

Section 1803.1 of the SFBC requires that excavations for any purpose not remove support from adjacent or nearby structures without first protecting them against settlement or lateral movement. To ensure this protection during dewatering, the following mitigation measure shall be implemented where adjacent or nearby structures exist:

MM GE-2a *Mitigation to Minimize Dewatering Impacts During Construction. Prior to the issuance of any permit for a construction activity that would involve dewatering that could affect structures on adjacent or nearby properties, the Applicant shall, in compliance with Section 1803.1 of the* San Francisco Building Code *(SFBC), include in the permit application methods and techniques to ensure that dewatering would not lower the water table such that unacceptable settlement (as determined by a California Certified Engineering Geologist [CEG] or California Registered Geotechnical Engineer [GE]) at adjacent or nearby properties would occur. Such methods and technologies shall be based on the specific conditions at the construction site and could include, but are not necessarily limited to, the following:*

- *Excavating below the groundwater table in confined areas with steel sheet piling driven below the base elevation of the proposed excavation, installation of bracing to support the excavation walls as required and, if necessary, underpinning the foundations of adjacent structures. Subsequently, the excavation would be carried out and seepage that enters the dammed area would be pumped out.*
- *Perform dewatering using methods such as wellpoint systems, drainage ditches, and sump pumps.*

The excavation or dewatering methods shall be monitored to detect ground settlement and to monitor individual dewatering activities in the vicinity of an excavation. Monitoring results shall be submitted to the San Francisco Department of Building Inspection (DBI). In the event of unacceptable ground movement, as determined by DBI inspections and/or the review of monitoring results, all excavation work shall cease and corrective measures (including, for example, different dewatering methods and/or ground stabilization methods) shall be determined by the Project CEG or GE and reviewed and approved by DBI. No construction permit involving dewatering would be issued until the Project CEG or GE and DBI have approved dewatering and/or ground stabilization methods. The Project CEG or GE shall implement the corrective measures and continue monitoring activities.

With implementation of those dewatering techniques, groundwater level monitoring, and subsurface controls, as specified in the SFBC and required by mitigation measure MM GE-2a, groundwater levels in the area would not be lowered such that that unacceptable settlement at adjacent or nearby properties would occur. Consequently, settlement hazards related to dewatering would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact GE-2b **Construction at HPS Phase II would not result in damage to structures caused by settlement from lowering of groundwater levels. (Less than Significant with Mitigation) *[Criterion L.c]***

At HPS Phase II, construction activities would have the potential to affect groundwater levels. Project construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. The dewatering could cause settlement of adjacent soils that could damage the overlying foundations of existing buildings. Groundwater levels in the artificial fill and the underlying estuarine deposits at HPS Phase II are generally less than 15 feet below the ground surface and experience varying degrees of tidal fluctuation. Some minor dewatering may be needed to reduce heads to several feet or more below excavation bottoms and to address seepage and the potential for settlement.

The requirements of Section 1803.1 of the SFBC as indicated above would be applicable to dewatering activities at HPS Phase II. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a, groundwater levels in the area would not be lowered such that that unacceptable settlement at adjacent or nearby properties would occur. Consequently, settlement hazards related to dewatering would be less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-2 **Construction activities associated with the Project would not result in damage to structures caused by settlement from lowering of groundwater levels. (Less than Significant with Mitigation) *[Criterion L.c]***

Project construction activities would have the potential to affect groundwater levels. Project construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. The dewatering could cause settlement of adjacent soils that could damage the overlying foundations of existing buildings. Groundwater levels in the artificial fill and the underlying estuarine deposits generally are less than 15 feet below the ground surface and experience varying degrees of tidal fluctuation. Some minor dewatering may be needed to reduce heads to several feet or more below

excavation bottoms and to address seepage and the potential for settlement. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a, groundwater levels in the area would not be lowered such that that unacceptable settlement at adjacent or nearby properties would occur. Consequently, settlement hazards related to dewatering would be less than significant.

Impact GE-3: Destabilization of Bedrock from Rock Removal Activities

Impact GE-3 **Rock removal activities at the Alice Griffith Public Housing site and the Jamestown area would not result in damage to structures from vibration and/or settlement caused by the fracturing of bedrock for excavation. (Less than Significant with Mitigation) *[Criterion L.c]***

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. Heavy equipment rock removal methods could include ripping (such as a large tractor equipped with a ripper attachment) or mechanical rock-breaking using hammers, hoe-rams, splitters, and/or cutters. Harder areas of bedrock may need to be removed using a technique known as controlled rock fragmentation. Controlled rock fragmentation technologies include pulse plasma rock fragmentation (PPRF), controlled foam injection, and controlled blasting. It may be necessary to use a combination of these techniques. Controlled blasting usually can be performed at noise levels below typical building demolition noise levels (80-100 dBA).[411] PPRF can be performed at noise and vibration levels below those of controlled blasting (1/36 and 1/20, respectively, at 20 meters [about 65 feet]).[412] Controlled foam injection reduces the airblast, flyrock, and fumes associated with uncovered explosive-based techniques.[413]

Controlled blasting fractures bedrock by using explosives to produce a vibration or shockwave that breaks the rock. Controlled foam injection forces an aqueous polymer into existing rock fractures and enlarges them until the rock fails. PPRF uses an electrical impulse to create a flash of extremely high heat that shatters the rock by causing it to expand beyond its capacity to maintain its structural integrity.

The majority of the area at the Alice Griffith Public Housing site consists of thin fill over bedrock and artificial fill underlain by young bay mud over bedrock. The bedrock is at elevations ranging from +45 feet San Francisco City Datum (SFCD) to -10 feet SFCD. The bedrock, which may include localized well-cemented beds, would need to be removed in the northern portion of the parcel to depths ranging from 2 feet to 23 feet below the existing ground surface. It's estimated that 140,000 cubic yards of rock will need to be removed; at least 70 percent of this rock would be removed by heavy equipment, but the remaining 30 percent (approximately 42,000 cubic yards) may need to be removed by controlled rock fragmentation.[414]

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411 MACTEC, *CP-HPSII Rock Fragmentation*, prepared for Lennar Urban, June, 2009.
412 KAPRA & Associates, *Pulse Plasma Rock Fragmentation Technology*, 2001.
413 Young, C. and C. Graham, *Controlled Foam Injection - Progress Towards Automated Hard Rock Excavation*, 5th International Symposium on Mine Mechanics and Automation, Ontario, Canada, June, 1999.
414 MACTEC, June, 2009.

The majority of the area at Jamestown is underlain by bedrock at an elevation of +100 feet SFCD to the northeast and +150 feet SFCD to the southwest. Development of this parcel would involve the removal of bedrock, which may include localized well-cemented beds, to depths ranging from 2 feet to 62 feet below the existing ground surface. It's estimated that 140,000 CYs of rock will need to be removed; at least 30 percent of this rock would be removed by heavy equipment; the remaining 70 percent (approximately 98,000 cubic yards) may need to be removed by controlled rock fragmentation. Access constraints caused by the steep slopes in the area may reduce the amount of rock that could be removed using heavy equipment.[415]

Section 1803.1 of the SFBC requires that excavations for any purpose not remove support from adjacent or nearby structures without first protecting them against settlement or lateral movement. To ensure this protection during controlled rock fragmentation activities, the following mitigation measure would be implemented:

MM GE-3 *Mitigation to Minimize Rock Fragmentation Impacts During Construction. Prior to the issuance of any permit for a construction activity that would involve controlled rock fragmentation that could cause settlement or lateral movement of structures on adjacent or nearby properties, the Applicant shall, in compliance with Section 1803.1 of the* San Francisco Building Code *(SFBC), include in the permit application methods and techniques to ensure that controlled rock fragmentation would not cause unacceptable vibration and/or settlement or lateral movement of structures at adjacent or nearby properties. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the following:*

- *Pre-excavation surveying of potentially affected structures.*
- *Underpinning of foundations of potentially affected structures, as necessary.*
- *The excavation plan shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of an excavation. Monitoring results shall be submitted to DBI. In the event of unacceptable ground movement, as determined by DBI inspections, all excavation work shall cease and corrective measures shall be implemented. The controlled rock fragmentation program and ground stabilization measures shall be reevaluated and approved by the DBI.*

With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant. Rock removal activities would not be required at any other areas on the Project site.

[415] MACTEC, June, 2009.

Operational Impacts

Impact GE-4: Seismically Induced Groundshaking

Impact of Candlestick Point

Impact GE-4a **Implementation of the Project at Candlestick Point, including the Yosemite Slough bridge and Alice Griffith Housing, would not expose people or structures to substantial adverse effects caused by seismically induced groundshaking. (Less than Significant with Mitigation) *[Criterion L.a(ii)]***

Candlestick Point

Candlestick Point could be exposed to groundshaking hazards. Groundshaking is the most widespread effect of earthquakes and would pose a seismic threat to the development at Candlestick Point. Active faults capable of producing strong groundshaking exist near the Project site. Most notable of these faults are the San Andreas, San Gregorio, and Hayward Faults. The proposed new structures could experience strong groundshaking from an earthquake on any of these faults.

To address groundshaking, the design-level geotechnical investigations to be performed must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Project components, as required by Chapter 16, Structural Design, and Chapter 18, Soils and Foundations, of the SFBC. Accordingly, the following mitigation measure shall be implemented:

MM GE-4a.1 *Site-Specific Geotechnical Investigation with Seismic Analyses. Prior to the issuance of any building permits for the Project site:*

- *The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the* San Francisco Building Code *(SFBC), the* Seismic Hazards Mapping Act*, and requirements contained in CGS Special Publication 117A "Guidelines for Evaluating and Mitigating Seismic Hazards in California." In addition, all engineering practices and analyses of peak ground accelerations and structural design shall be consistent with SFBC standards to ensure that structures can withstand expected ground accelerations. The CEG or GE shall determine and DBI shall approve design requirements for foundations and all other improvements associated with the permit application.*
- *DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.*
- *All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.*
- *The Project CEG or GE shall be responsible for ensuring compliance with these requirements.*

Implementation of site-specific design measures would ensure that Project structures would withstand expected seismic ground accelerations. Consequently, seismic hazards related to groundshaking would be less than significant.

Alice Griffith Public Housing

The Alice Griffith Public Housing site and new development on the site would be subject to HUD approval and Executive Order 12699. The new development would also be subject to the SFBC, which would meet the requirements of the Executive Order. The San Francisco Department of Building Inspection (DBI) would be the agency responsible for implementing and enforcing appropriate seismic design and construction standards for the new development. DBI would be the City's responsible agency. Federal implementation and enforcement of the seismic safety program would be achieved through notification by the City to the building owner, architect, engineer, or contractor of the required minimum standards and requiring written acknowledgement of awareness of the requirements and of intent to comply.

HUD could require some form of compliance certification, such as the engineer's and architect's signed and stamped verification of seismic design codes, standards, and practices used in the design and construction of the buildings, or submittal of Planning Department and/or DBI permit review and inspection documents to HUD. To ensure compliance with any such requirements, the following mitigation measure shall be implemented for the Alice Griffith Public Housing development:

MM GE-4a.2 *Seismic Design Compliance Documentation. Prior to the issuance of building permits for the replacement of the Alice Griffith Public Housing site, the Applicant shall submit any and all seismic design compliance documentation to the HUD, as required by that agency. The Project Developer shall confirm, by copy of all documents submitted, including transmittal, compliance with this requirement to DBI. The Project California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE) shall be responsible for verifying Project compliance with this requirement.*

Implementation of mitigation measures MM GE-4a.1 and MM GE-4a.2 would ensure that impacts to the Alice Griffith Public Housing from seismic ground acceleration and groundshaking would be reduced a less-than-significant level.

Yosemite Slough Bridge

The Yosemite Slough bridge could be exposed to groundshaking hazards. Groundshaking is the most widespread effect of earthquakes and would pose a seismic threat to the Project. Active faults capable of producing strong groundshaking exist near the Project site. Most notable of these faults are the San Andreas, San Gregorio, and Hayward Faults. The proposed new structures could experience strong groundshaking from an earthquake on any of these faults.

To address groundshaking, design-level geotechnical investigations as required by mitigation measure MM GE-4a.3 would include site-specific seismic analyses to evaluate the seismic safety of bridge design of the bridge based on Caltrans and Department of Public Works Bureau of Engineering (BOE specifications. The following mitigation measure shall be implemented:

MM GE-4a.3 *Site-specific Seismic Analyses to Ensure Safety of Bridge Design. Prior to the issuance of any building permits for the Project site, the California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE) for the Project shall confirm that the design-level geotechnical*

*investigation for the Yosemite Slough bridge is based on Caltrans specifications (*Bridge Design Specifications*, Section 20 of* Bridge Memos to Designers*,* Seismic Design Criteria *as previously described) and meets the San Francisco Department of Public Works Bureau of Engineering (BOE) requirements. The Project CEG or GE and California Registered Structural Engineer ((SE) shall approve bridge design. No building permits shall be issued until the CEG or GE and SE verify that the Project's bridge design complies with all Caltrans specifications and BOE requirements.*

Implementation of mitigation measures MM GE-4a.1 and MM GE-4a.3 would be required for the bridge. Based on the seismic analyses required by mitigation measures MM GE-4a.1 and MM GE-4a.3, bridge design would be modified or strengthened and constructed to the highest feasible seismic safety standards consistent with the BOE requirements, as deemed appropriate by the Project CEG or GE and SE and verified by BOE, if the anticipated seismic forces (calculated peak vertical and horizontal ground accelerations caused by groundshaking) were found to be greater than anticipated. Compliance with these BOE requirements would ensure potential impacts on the bridge from groundshaking would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact GE-4b **Implementation of the Project at HPS Phase II would not expose people and structures to substantial adverse effects caused by seismically induced groundshaking. (Less than Significant with Mitigation) *[Criterion L.a(ii)]***

There is a potential for exposure to adverse effects caused by groundshaking in the HPS Phase II site. Groundshaking is the most widespread effect of earthquakes and would pose a seismic threat to the development at HPS Phase II. Active faults capable of producing strong groundshaking exist near the Project site. Most notable of these faults are the San Andreas, San Gregorio, and Hayward Faults. The proposed new structures could experience strong groundshaking from an earthquake on any of these faults.

To address groundshaking, the design-level geotechnical investigations to be performed must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Project components, as required by Chapter 16 (Structural Design) and Chapter 18 (Soils and Foundations) of the SFBC. Accordingly, mitigation measure MM GE-4.a1 would be implemented for development of HPS Phase II. Based on the seismic analyses, structure designs would be modified or strengthened and constructed to the highest feasible seismic safety standards, consistent with the requirements of the SFBC, as deemed appropriate by the Project engineer and verified by DBI, if the anticipated seismic forces (calculated peak vertical and horizontal ground accelerations caused by groundshaking) were found to be greater than anticipated. Implementation of this mitigation measure would ensure that potential impacts from groundshaking would be less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-4 **Implementation of the Project would not expose people and structures to substantial adverse effects caused by seismically induced groundshaking. (Less than Significant with Mitigation) *[Criterion L.a(ii)]***

The potential for exposure to adverse effects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of Project structures and the Yosemite Slough bridge, as required by the SFBC

and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant.

Impact GE-5: Seismically Induced Ground Failure

Impact of Candlestick Point

Impact GE-5a **Implementation of the Project at Candlestick Point, including the Alice Griffith Housing and Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement. (Less than Significant with Mitigation) *[Criterion L.a(iii)]***

Candlestick Point

The Candlestick Point site could be exposed to liquefaction hazards. Liquefaction-related phenomena can include lateral spreading, ground oscillation, loss of bearing strength, vertical settlement from densification (subsidence), buoyancy effects, sand boils, and flow failures, all of which could cause damage to the proposed structures in the Candlestick Point site. Damage from liquefaction and lateral spreading is generally most severe when liquefaction occurs within 15 to 20 feet below the ground surface. The Orthents and Urban Land soils in the lowland areas of the Candlestick Point site have a very high potential for liquefaction. In particular, loosely compacted granular soil below the ground-water table with uniform grain size and low plasticity are most susceptible to liquefaction. Based on the subsurface data reviewed to date, these types of soil deposits generally are limited to isolated pockets and random layers within the overall soil profile, and, therefore, the unmitigated risk is considered low to moderate and can be treated using standard engineering practices to protect improvements, as outlined previously in Table III.L-7 and Table III.L-8.[416] If more extensive zones susceptible to liquefaction were encountered during future exploration, further mitigation measures could be necessary. The proposed foundations for structures, vaults, and pipelines would be the components most vulnerable to damage from liquefaction-related phenomena. Localized hazards could occur in open space areas, but mitigation would not be necessary where no habitable structures or critical utilities would be present.

Seismically induced settlement can occur in areas underlain by compressible or poorly consolidated sediments. Stream channel deposits and recent valley alluvium generally are the most susceptible to earthquake-induced settlement. Additionally, some artificial fills are susceptible to mobilization and densification, resulting in earthquake-induced subsidence. Artificial fills exist in the lowland areas of Candlestick Point (refer to Figure III.L-1). In addition, historical shoreline maps show that artificial fill placement extends as far as 3,300 feet into the Bay.[417]

CGS Special Publication 117A outlines the protocol for analysis and treatment of liquefaction-related hazards, including estimates of vertical settlement and lateral spreading. Prediction of liquefaction-related settlement is necessarily approximate, and related hazard assessment and development of recommendations for treatment of such hazards must be performed conservatively, as recommended by CGS Special Publication 117A. A similarly conservative approach is recommended by CGS Special

[416] ENGEO, 2009.
[417] ENGEO, 2008.

Publication 117A when estimating the amount of localized differential settlement likely to occur as part of the overall predicted settlement: localized differential settlements up to two-thirds of the total settlements anticipated must be assumed until more precise predictions of differential settlements can be made.

Design and construction of the structures and facilities at Candlestick Point would incorporate appropriate engineering practices to ensure seismic stability, some of which are explained in more detail below, as required by Chapter 16, Structural Design, and Chapter 18, Soils and Foundations, of the SFBC. Sections 1607 through 1614 contain the formulae, tables, and graphs by which the Project engineer would develop the structural specifications for building design and which would be used by DBI to verify the applicability of the specifications. Sections 1804 through 1812 contain similar information for the design and verification of adequate soils and foundation support for individual elements of the Project. Section 1802 requires the use of this information in the seismic analyses prepared for the site-specific investigations that must be prepared in connection with the permits for individual elements of the Project.

Where shallow foundations would be underlain by artificial fill and the estimated settlement would be small, the treatment could employ a combination of removal and recompaction with the placement of geogrid[418] beneath structures to help distribute differential settlement that might occur. Treatment for mid-rise and high-rise structures could include supporting these structures on deep foundations bearing in strata below the potentially liquefiable layer with flexible utility connections to allow some settlement beneath the buildings. Mitigation measure MM GE-4a.1 would reduce risks from liquefaction. If liquefaction estimates were such that MM GE-4a.1 would not address liquefaction and settlement-related impacts adequately, further mitigation would include one or more of the additional structural and/or ground-improvement procedures identified in mitigation measure MM GE-5a. Selection of the appropriate procedures would be dependent on the land use, development type, soil profile, and estimated settlement.

To avoid or reduce the potential liquefaction hazards at Candlestick Point to a less-than-significant level, implementation of mitigation measure MM GE-5a would require the Applicant to comply with site-specific requirements established by State and local codes and by DBI and other agencies that would be involved in reviewing and issuing permits for buildings and infrastructure at the Project site.

To reduce or avoid impacts related to seismically induced ground failure such as liquefaction, lateral spreading, and/or settlement where the measures described above are not adequate, the following mitigation measure shall be implemented.

MM GE-5a *Site-Specific Geotechnical Investigation with Analyses of Liquefaction, Lateral Spreading and/or Settlement. Prior to issuance of building permits for the Project site:*

- *The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A "Guidelines for Evaluating and Mitigating Seismic Hazards in California."*

[418] Geogrids are synthetic fabrics (fiberglass, polyester, treated steel, etc.) formed into nets with openings more than ¼ inch in size to allow the fabric to interlock with surrounding soil, rock, and other below-ground-level materials and to function as reinforcement.

In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure seismic stability, including reduction of potential liquefaction hazards.

- *DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.*
- *All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.*
- *The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce liquefaction hazards. The engineering design techniques to reduce liquefaction hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval, including, but not necessarily limited to:*

Structural Measures

- *Construction of deep foundations, which transfer loads to competent strata beneath the zone susceptible to liquefaction, for critical utilities and shallow foundations*
- *Structural mat foundations to distribute concentrated load to prevent damage to structures*

Ground Improvement Measures

- *Additional over-excavation and replacement of unstable soil with engineering-compacted fill*
- *Dynamic compaction, such as Deep Dynamic Compaction (DDC) or Rapid Impact Compaction (RIC), to densify loose soils below the groundwater table*
- *Vibro-compaction, sometimes referred to as vibro-floatation, to densify loose soils below the groundwater table*
- *Stone columns to provide pore pressure dissipation pathways for soil, compact loose soil between columns, and provide additional bearing support beneath foundations*
- *Soil-cement columns to densify loose soils and provide additional bearing support beneath foundations*
- *The Project CEG or GE shall be responsible for ensuring compliance with these requirements.*

Implementation of mitigation measures MM GE-4a.1 and MM GE-5a would reduce or avoid impacts related to seismically induced ground failure such as liquefaction, lateral spreading, and/or settlement by applying structural and ground improvement measures to minimize these risks. Implementation of this mitigation would reduce the impact to less than significant.

Alice Griffith Housing

New development on the Alice Griffith Public Housing site would be subject to HUD approval and Executive Order 12699. The new development would be subject to the SFBC, which would meet the requirements of the Executive Order. The San Francisco Department of Building Inspection (DBI) would be the agency responsible for implementing and enforcing appropriate seismic design and construction standards for the new development. DBI would be the City's responsible agency. Federal implementation

and enforcement of the seismic safety program would be achieved through notification by the City to the building owner, architect, engineer, or contractor of the required minimum standards and requiring written acknowledgement of awareness of the requirements and of intent to comply.

HUD could require some form of compliance certification, such as the engineer's and architect's signed and stamped verification of seismic design codes, standards, and practices used in the design and construction of the buildings, or submittal of Planning Department and/or DBI permit review and inspection documents to HUD. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-5a would apply to this impact, and would reduce this impact a less-than-significant level.

Yosemite Slough Bridge

The Yosemite Slough bridge area could be exposed to liquefaction hazards, as described in the discussion regarding Candlestick Point, above. Artificial fills occur in the lowland areas near the proposed Yosemite Slough bridge (refer to Figure III.L-1). In addition, historical shoreline maps show that artificial fill placement extends as far as 1,100 feet into the Bay near the proposed Yosemite Slough bridge.[419]

CGS Special Publication 117A outlines the protocol for analysis and treatment of liquefaction-related hazards, including estimates of vertical settlement and lateral spreading. Design and construction of the bridge structures would incorporate appropriate engineering practices and building codes to ensure seismic stability, as required by BOE Standard Specifications Part 4 (Structures). The design of the bridge would be based on Caltrans specifications (*Bridge Design Specifications*, Section 20 of *Bridge Memos to Designers, Seismic Design Criteria*), and would meet the BOE requirements. Compliance with BOE requirements would ensure potential impacts would be reduced to a less-than-significant level. Bridge bents likely would be supported on deep foundations bearing in strata below the potentially liquefiable layer. At the bridge approaches, it could be possible to employ a combination of removal and recompaction using engineered fill with the placement of geogrid beneath structures to help distribute differential settlement that might occur. Mitigation measure MM GE-4a.1 would reduce risks from liquefaction. If liquefaction estimates were such that MM GE-4a.1 would not address liquefaction and settlement-related impacts adequately, further mitigation would include one or more of the additional structural and/or ground-improvement identified in mitigation measures MM GE-5a and MM GE-4a.3. Selection of the appropriate procedures would be dependent on the bridge design, soil profile, and estimated settlement.

To reduce the impact of potential liquefaction hazards to a less-than-significant level at Yosemite Slough bridge, implementation of mitigation measure MM GE-4a.1, MM GE-4a.3, and MM GE-5a would require Applicant to comply with site-specific requirements established by DBI and other agencies that would be involved in reviewing and issuing permits for buildings and infrastructure at the Project site. Design and construction of the bridge structures would incorporate appropriate engineering practices as outlined in the site-specific geotechnical report and in Caltrans requirements to ensure seismic stability, as required by BOE Standard Specifications Part 4 (Structures). Implementation of these mitigation measures would ensure compliance with the requirements of the Building Code, Caltrans, and the BOE, and would avoid or reduce potential impacts from seismically induced ground failure a less-than-significant level.

[419] ENGEO, 2008.

Impact of Hunters Point Shipyard Phase II

Impact GE-5b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement. (Less than Significant with Mitigation) *[Criterion L.a(iii)]***

Structures at the HPS Phase II site could be exposed to seismically induced ground failure, including liquefaction hazards. Liquefaction-related phenomena could include lateral spreading, ground oscillation, loss of bearing strength, vertical settlement from densification (subsidence), buoyancy effects, sand boils, and flow failures, any of which could cause damage to the proposed structures in the HPS Phase II site. Damage from liquefaction and lateral spreading generally is most severe when liquefaction occurs within 15 to 20 feet below the ground surface. The Orthents and Urban Land soils in the lowland areas of the HPS Phase II site have a very high potential for liquefaction. In particular, loosely compacted granular soil with uniform grain size and low plasticity below the groundwater table are most susceptible to liquefaction. Because these types of soil deposits generally are limited to isolated pockets and random layers in the overall soil profile, with the exception of the area in the vicinity of the southeast-facing shoreline in Parcels D and E at HPS, the unmitigated risk is considered low to moderate: it can be treated using standard engineering practices to protect improvements.[420] If more extensive zones susceptible to liquefaction were encountered during future exploration, as may be the case in the vicinity of the southeast-facing shoreline in Parcels D and E at HPS which would become open space, additional mitigation measures, such as those described in MM GE-5a, above, could be necessary. The proposed foundations for structures, vaults, and pipelines would be the components most vulnerable to damage from liquefaction-related phenomena. Localized hazards may occur in open space areas, without mitigation, where habitable structures or critical utilities would not be present.

Seismically induced settlement could occur in areas underlain by compressible or poorly consolidated sediments. Stream channel deposits and recent valley alluvium generally are the most susceptible to earthquake-induced settlement. Additionally, some artificial fills are susceptible to mobilization and densification, resulting in earthquake-induced subsidence. Artificial fills exist in the lowland areas of HPS Phase II (refer to Figure III.L-1). In addition, historical shoreline maps show that artificial fill placement extends as far as 3,300 feet into the Bay.[421]

CGS Special Publication 117A outlines the protocol for analysis and treatment of liquefaction-related hazards, including estimates of vertical settlement and lateral spreading. Prediction of liquefaction-related settlement is necessarily approximate, and related hazard assessment and development of recommendations for treatment of such hazards must be performed conservatively, as recommended by CGS Special Publication 117A. A similarly conservative approach is recommended by CGS Special Publication 117A when estimating the amount of localized differential settlement likely to occur as part of the overall predicted settlement: localized differential settlements up to two-thirds of the total settlements anticipated must be assumed until more precise predictions of differential settlements can be made.

[420] ENGEO, 2009.
[421] ENGEO, 2008.

Design and construction of the structures and facilities in the HPS Phase II site would incorporate appropriate engineering practices to ensure seismic stability, some of which are explained in more detail below, as required by Chapter 16 (Structural Design) and Chapter 18 (Soils and Foundations) of the SFBC. Sections 1607 through 1614 contain the formulae, tables, and graphs by which the Project engineer would develop the structural specifications for building design and which would be used by DBI to verify the applicability of the specifications. Sections 1804 through 1812 contain similar information for the design and verification of adequate soils and foundation support for a project. Section 1802 requires the use of this information in the seismic analyses of the Project site.

Where shallow foundations would be underlain by artificial fill and the estimated settlements are small, treatment could employ a combination of removal and recompaction with the placement of geogrid beneath structures to help distribute differential settlement that might occur. Treatment for mid-rise and high-rise structures could include supporting these structures on deep foundations bearing in strata below the potentially liquefiable layer with flexible utility connections to allow some settlement beneath the buildings. Mitigation measure MM GE-4a.1 would reduce risks from liquefaction. If liquefaction estimates were such that MM GE-4a.1 would not address liquefaction and settlement-related impacts adequately, further mitigation would include one or more of the additional structural and/or ground-improvement measures identified in mitigation measure MM GE-5a, above. Selection of the appropriate mitigation would be dependent on the land use, development type, soil profile, and estimated settlement. At HPS Phase II, there could be environmental constraints limiting the potential use of certain mitigation measures because of groundwater and soil contamination.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-5 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement. (Less than Significant with Mitigation)** ***[Criterion L.a(iii)]***

- The potential for adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Project structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review required by MM GE-4a.1, MM GE-4a.2, MM GE4a.3, and MM GE-5a would ensure that all necessary methods and techniques would be incorporated in the design for Project foundations and structures to reduce potential impacts from ground failure or liquefaction to a less-than-significant level.

Impact GE-6: Seismically Induced Landslides

Impact of Candlestick Point

Impact GE-6a **Implementation of the Project at Candlestick Point, including the Alice Griffith Housing, would not expose people or structures to substantial adverse effects caused by seismically induced landslides. (Less than Significant with Mitigation) *[Criterion L.a(iv)]***

Candlestick Point

The Candlestick Point site could be exposed to landslide hazards. Earthquakes have the potential to induce landslides on both steep slopes and relatively level ground, especially in upland areas underlain by weathered bedrock or serpentinite. Potential landslide hazards in the Project site are presented in Figure III.L-3. The figure shows that the major landslide hazard area in at Candlestick Point is an approximate 2,500-foot-wide and 2,500-foot-long section on Bayview Hill around Bayview Park Road, east of Highway 101 and west of the State Park.[422]

Risks from landslides can be reduced by employing proven methods generally accepted by California Certified Engineering Geologists, to reduce these hazards. Treatment could employ a combination of removal and recompaction with the placement of geogrid[423] beneath structures and/or supporting mid- and high-rise structures on deep foundations bearing in strata below the potentially liquefiable layer with flexible utility connections to allow some settlement beneath the buildings. Selection of the appropriate procedures would be dependent on the land use, development type, and soil profile. To address the risk of landslides, the following mitigation measure shall be implemented:

MM GE-6a *Site-Specific Geotechnical Investigation with Landslide Risk Analyses. Prior to issuance of building permits for the Project site:*

- *The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A "Guidelines for Evaluating and Mitigating Seismic Hazards in California." In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure seismic stability, including reduction of potential landslide hazards.*
- *DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.*

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[422] CGS, 2000.

[423] Geogrids are synthetic fabrics (fiberglass, polyester, treated steel, etc.) formed into nets with openings more than ¼ inch in size to allow the fabric to interlock with surrounding soil, rock, and other below-ground-level materials and to function as reinforcement.

- *All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.*
- *The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce landslide hazards. The engineering design techniques to reduce landslide hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of landslides and potentially unstable slopes and shall identify means to avoid the hazard or support the design of engineering procedures to stabilize the slopes, as required by Chapter 18 (Soils and Foundations) of the SFBC, as well as the procedures outlined in CGS Special Publication 117A. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project's slope-stability specifications, including the appropriate foundation designs for structures on slopes and which would be used by DBI to verify the applicability of the specifications. If the presence of unstable slopes is identified, appropriate support and protection procedures shall be designed and implemented to maintain the stability of slopes adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities at the Project site. These stabilization procedures, including, but not necessarily limited to, the following:*
  - *Retaining walls, rock buttresses, screw anchors, or concrete piers*
  - *Slope drainage or removal of unstable materials*
  - *Rockfall catch fences, rockfall mesh netting, or deflection walls*
  - *Setbacks at the toe of slopes*
  - *Avoidance of highly unstable areas*
- *The Project CEG or GE shall be responsible for ensuring compliance with these requirements.*

Implementation of this measure would ensure that hazards caused by the potential effects of seismically induced landslides would be less than significant.

Alice Griffith Public Housing

Given its proximity to Bayview Hill, the Alice Griffith Housing site could be exposed to the risks of landslides. New development on the Alice Griffith Public Housing site would be subject to HUD approval and Executive Order 12699. The new development would be subject to the SFBC, which would meet the requirements of the Executive Order. The San Francisco Department of Building Inspection (DBI) would be the agency responsible for implementing and enforcing appropriate seismic design and construction standards for the new development. DBI would be the City's responsible agency. Federal implementation and enforcement of the seismic safety program would be achieved through notification by the City to the building owner, architect, engineer, or contractor of the required minimum standards and requiring written acknowledgement of awareness of the requirements and of intent to comply.

HUD could require some form of compliance certification, such as the engineer's and architect's signed and stamped verification of seismic design codes, standards, and practices used in the design and construction of the buildings, or submittal of Planning Department and/or DBI permit review and inspection documents HUD. Compliance with mitigation measure MM GE-4a.2 would ensure that all appropriate documentation is submitted to the HUD, if requested. Implementation of this mitigation, as

well as mitigation measure MM GE-6a, would ensure that the impact to Alice Griffith Housing from seismically induced landslides would be less than significant.

Yosemite Slough Bridge

The potential for exposure of the Yosemite Slough bridge to adverse effects caused by seismically induced landslides would be unlikely because of the low-lying topography in the vicinity of the bridge. There are no mapped seismically induced landslides areas on the Project site or near the slough. Therefore, there would be no impact on the Yosemite Slough bridge caused by seismically induced landslides.

Impact of Hunters Point Shipyard Phase II

Impact GE-6b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by seismically induced landslides. (No Impact) *[Criterion L.a(iv)]***

As shown in Figure III.L-3, seismically induced landslides in the HPS Phase II site exist in the areas uphill from the Project boundaries where serpentinite is abundant in the shear zone. A few small landslide hazards exist in a large serpentinite block of the Hunters Point Shear Zone, between Innes Avenue and Crisp Road, northwest of HPS Phase II.[424] Slopes adjacent to the Phase II site have been rebuilt as subdrained engineered slopes during ongoing Phase I development, and any remaining areas of potential landslide hazards are outside the reach of the Phase II boundaries. Therefore, there would be no impact caused by seismically induced landslides. No mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-6 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by seismically induced landslides. (Less than Significant with Mitigation) *[Criterion L.a(iv)]***

The potential for adverse effects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level.

Impact GE-7: Shoreline Instability

Impact of Candlestick Point

Impact GE-7a **Implementation of the Project at Candlestick Point would not expose people or structures to substantial adverse effects caused by shoreline instability. (Less than Significant with Mitigation) *[Criterion L.c]***

The shoreline along Candlestick Point consists of slopes protected by rip-rap or concrete debris and several areas of unprotected, beach-fronted slopes, exposed mudflats, and vegetation. Along the majority of the south-facing shoreline, active erosion exists. Stabilization of the Candlestick Point shoreline would include the placement of additional (rock) riprap to improve the existing rip-rap edge on most of the Northern,

[424] CGS, Seismic Hazard Zone Map, CCSF, November 2000.

Eastern, and Southern shoreline; the creation of new tidal habitat in two reaches of natural edge on the Northern shoreline by laying back the slope to a flatter configuration and adding marsh plantings; and the creation of a sandy recreational beach at the mid-point of the Wind Meadow reach along the Eastern Shoreline by laying the slope back at a 6H:1V or flatter configuration. In addition to improvements to shoreline features, and to reduce the potential for a future rise in sea level that could adversely affect the Project site, the Project includes modification of the land surface through grading and the importation of fill. These modifications would raise the surface elevation by 36 inches above the 100-year base flood elevation and building finish floor elevations would be 6 inches above that (total of 42 inches above Base Flood Elevation) per mitigation measure MM HY-12a.1 to account for future sea level rise, and include an adaptive management strategy that would provide further protection for future sea level rise of 55 inches or more if this should become necessary. These improvements are intended to, will be designed to, and, therefore, would improve the stability of the shoreline. Therefore, the Project would not result in exposure of structures and facilities at Candlestick Point to substantial adverse effects caused by shoreline instability. The impact would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact GE-7b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by shoreline instability. (Less than Significant with Mitigation) *[Criterion L.c]***

The existing shoreline along the HPS Phase II site consists of rip-rap protected slopes, unprotected embankments fronted by beach, concrete submarine dry-docks, pile-supported wharves, some of which are failing, quay-walls, concrete bulkheads, timber decking and piles, and dilapidated piers. Most of the naval structures are in deteriorated condition. In some areas of the HPS Phase II shoreline, piers and wharfs have deteriorated from lack of maintenance and near-shore settlement has occurred, resulting in damage to seawall structures. Repairs of existing HPS Phase II seawall structures would involve replacement of piles and tie-back systems and replacement of eroded fill material behind seawall structures. In some locations, placement of buttress fill (below the water surface) would be needed to enhance structural stability of some seawall structures. At the submarine drydocks in Parcels B and C, the concrete bulkheads would be left in place, but disconnected from the shoreline by demolishing the near-shore sections to prevent public access. Slope stability would be improved by placing rock or sand buttresses along the quay-wall, applying high strength concrete grout to exposed surfaces and/or epoxy mix application to cracks as needed, and installing weep-holes above low tide elevation to relieve the loading from the fill to be placed along the shoreline. At the berths and wharves in Parcels B, C, D, and E, new steel sheet pile bulkheads would be constructed behind the existing corroded bulkheads; reinforced concrete beams, deck slabs and steel caisson piles would be repaired; the upper 10 to 15 feet of the concrete wall facing, as well as the timber cribbing and bank rock fill would be removed and the facing sloped back at a 2H:1V slope and protected with rock facing to provide a more natural-looking surface without any additional bayfill. The modification of the drydocks, berths, and wharves would preclude public access, thereby creating opportunities for waterbirds to roost on the retained portions of these structures. In addition to improvements to shoreline features, and to reduce the potential for a future rise in sea level that could adversely affect the Project site, the Project includes modification of the land surface through grading and the importation of fill. These modifications would raise the surface elevation by 36 inches above the 100-year base flood elevation and building finish floor elevations would be 6 inches above that

(total of 42 inches above Base Flood Elevation) per mitigation measure MM HY-12a.1 to account for future sea level rise and include an adaptive management strategy that would provide further protection for future sea level rise up to 55 inches if this should become necessary. These improvements are intended to, will be designed to, and, therefore, would improve the stability of the shoreline. Therefore, the Project would not result in exposure of structures and facilities at HPS Phase II to substantial adverse effects caused by shoreline instability. The impact would be less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-7 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by shoreline instability. (Less than Significant with Mitigation) *[Criterion L.c]***

The existing shoreline exhibits active erosion and consists of areas of unprotected slopes and dilapidated naval pier and wharf structures. The Project would make numerous shoreline improvements, including additional rip-rap, creation of new beach and tidal habitat, and some grading and importation of fill at certain locations. These modifications would raise the surface elevation by 36 inches above the 100-year base flood elevation and building finish floor elevations would be 6 inches above that (total of 42 inches above Base Flood Elevation) per mitigation measure MM HY-12a.1 to account for future sea level rise and include an adaptive management strategy that would provide further protection for future sea level rise up to 55 inches if this should become necessary. These improvements are intended to, will be designed to, and, therefore, would improve the stability of the shoreline. Therefore, the Project would not result in exposure of structures and facilities at the Project site to substantial adverse effects caused by shoreline instability. The impact would be less than significant.

Impact GE-8: Landslides

Impact of Candlestick Point

Impact GE-8a **Implementation of the Project at Candlestick Point would not expose people or structures to substantial adverse effects caused by landslides. (Less than Significant with Mitigation) *[Criterion L.c]***

Candlestick Point

The Candlestick Point site, including the Alice Griffith Public Housing site, could be exposed to landslide hazards. Upland areas are most susceptible to landslides. Heavy rainfall contributes to this risk when soil becomes saturated. Site-specific geotechnical investigations would be required, and appropriate support and protection procedures would be designed and implemented for any identified unstable slopes.

Design and construction of the structures and facilities of the Project would incorporate appropriate engineering practices to ensure slope stability, as required by Chapter 16 (Structural Design) and Chapter 18 (Soils and Foundations) of the SFBC. Sections 1607 through 1614 contain the formulae, tables, and graphs by which the Project engineer would develop the structural specifications for building design and which would be used by DBI to verify the applicability of the specifications. Sections 1804 through 1812 contain similar information for the design and verification of adequate soils and foundation support for a project. Section 1802 requires the use of this information in the site-specific geotechnical

analyses of the Project site. Implementation of mitigation measure MM GE-6a would ensure that risks to structures from landslides would be avoided or reduced a less-than-significant level.

Yosemite Slough Bridge

The potential for exposure of the Yosemite Slough bridge to substantial adverse effects caused by landslides would be unlikely because of the low-lying topography in the location of the bridge. Therefore, there would be no impact to the Yosemite Slough bridge caused by landslides.

Impact of Hunters Point Shipyard Phase II

Impact GE-8b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by landslides. (Less than Significant with Mitigation) *[Criterion L.c]***

The potential for exposure to adverse effects caused by landslides in the HPS Phase II site exists in the upland areas of the shoreline where serpentinite is abundant in the shear zone. Heavy rainfall contributes to this risk when soil becomes saturated. Slopes adjacent to the HPS Phase II site were rebuilt as subdrained engineered slopes during ongoing Phase I development. Any remaining areas of mapped potential landslide hazards are outside the HPS Phase II boundaries.

If the presence of unstable slopes were identified during preparation of the site-specific geotechnical investigations, appropriate support and protection procedures would be designed and implemented, as required by mitigation measure MM GE-6a to maintain the stability of slopes adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities in the HPS Phase II site. Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer would develop the Project's slope-stability specifications, including the appropriate foundation designs for structures on slopes and which would be used by DBI to verify the applicability of the specifications. Implementation of mitigation measure MM GE-6a would ensure that risks to structures in HPS Phase II from landslides would be avoided or reduced a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-8 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by landslides. (Less than Significant with Mitigation) *[Criterion L.c]***

The potential for adverse effects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Project elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Project's impact with regard to landslides would be less than significant.

Impact GE-9: Soil Hazards—Settlement

Impact of Candlestick Point

Impact GE-9a **Implementation of the Project at Candlestick Point, including Alice Griffith Housing and the Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by damage from settlement. (Less than Significant with Mitigation) *[Criterion L.c]***

Candlestick Point

The Candlestick Point site could be exposed to settlement hazards. Unstable subsurface materials, such as artificial fill or soft Bay Mud deposits, are abundant in the Candlestick Point site (refer to Figure III.L-1). Slight to severe damage to structures could be caused by the settlement of poorly compacted fill or consolidation of very soft natural deposits. Extensive Young Bay Mud deposits are predominant in the eastern half of the site toward the shoreline. The rate of settlement of the Young Bay Mud from the load of the artificial fill is now very small, but further increase in loads, whether resulting from placement of new fill or the construction of buildings, would initiate a new cycle of consolidation settlement.[425,426] The Young Bay Mud is underlain by firmer soils and bedrock that do not pose settlement hazards.

Site grades would need to be raised over most of the Project site in order to reach minimum final grades and to compensate for settlement caused by densification during ground improvements and Young Bay Mud consolidation and secondary compression settlement caused by fill and building loads. Settlement in response to new loads would occur at rates similar to those that have occurred historically. Based on past observations, settlement caused by new loads could continue for a period of 5 to 50 years (or more) unless mitigated by surcharging, as explained below.

Where the site is underlain by an extensive zone of Young Bay Mud, consolidation settlements could be accelerated by use of surcharging, thereby allowing much of the future settlement to occur prior to construction of new improvements. Surcharging involves adding excess fill, for a limited period of time, above the elevation that is needed to achieve the intended final site grades. Prefabricated vertical drains (wick drains) can be used to decrease surcharge durations by increasing lateral soil drainage and allowing settlement that normally would occur over years to occur in months. Wick drains probably would be needed in most areas of the Project site because the development schedule probably would not allow for longer surcharge durations.

Surcharging can be used to reduce the settlements that result from net building loads. If the net building loads do not increase the stresses in the clay soils beyond those to which they have been consolidated previously under a surcharge load, the resulting settlements would be much smaller than they would be otherwise. When a soil has been loaded previously to a greater stress than the current stress, it is said to be over-consolidated. Over-consolidation reduces secondary compression. Consequently, surcharging offers three benefits: (1) the settlement that results from placement of new fill would be expedited; (2) the primary

[425] ENGEO, 2009.
[426] Engineering/Remediation Resources Group, Inc. and Shaw Environmental, Inc., 2009.

settlement caused by new building loads would be reduced; and (3) long-term settlements caused by secondary compression would be reduced.

Further secondary compression would occur following primary consolidation. Design-level studies must be conducted to better estimate the expected amounts of secondary compression and to evaluate the effectiveness of surcharging to reduce secondary compression.

Design and construction of structures and facilities in the Candlestick Point site would incorporate appropriate engineering practices, as required by Chapter 16 (Structural Design) and Chapter 18 (Soils and Foundations) of the SFBC. Sections 1607 through 1614 contain the formulae, tables, and graphs by which the Project engineer would develop the structural specifications for building design and which would be used by DBI to verify the applicability of the specifications. Sections 1804 through 1812 contain similar information for the design and verification of adequate soils and foundation support for a project. Section 1802 requires the use of this information in the soils analyses of the Project site.

Where shallow foundations would be underlain by poorly compacted artificial fill that may be subject to static settlement, it could be possible to employ a combination of removal and recompaction with the placement of geogrid beneath structures to help distribute differential settlement that might occur. Mid-rise and high-rise structures probably would be founded on deep foundations bearing in strata below the poorly compacted fill and soft Bay Mud deposits with flexible utility connections to allow some settlement beneath the buildings. If settlement estimates were such that the previously described treatments would not suffice, procedures outlined in mitigation measure MM GE-5a would avoid this impact or reduce it a less-than-significant level.

Selection of the appropriate ground improvement techniques would be dependent on the land use, development type, soil profile, and estimated settlement, as outlined previously in Table III.L-7 and Table III.L-8.[427] Implementation of mitigation measure MM GE-5a would ensure Project compliance with the requirements of the SFBC and would ensure that potential impacts from unstable subsurface soils would be less than significant.

Alice Griffith Public Housing

The Alice Griffith Public Housing site could be exposed to settlement hazards. New development on the Alice Griffith Public Housing site would be subject to HUD approval and Executive Order 12699. The new development would be subject to the SFBC, which would meet the requirements of the Executive Order. The San Francisco Department of Building Inspection (DBI) would be the agency responsible for implementing and enforcing appropriate seismic design and construction standards for the new development. DBI would be the City's responsible agency. Federal implementation and enforcement of the seismic safety program would be achieved through notification by the City to the building owner, architect, engineer, or contractor of the required minimum standards and requiring written acknowledgement of awareness of the requirements and of intent to comply.

HUD could require some form of compliance certification, such as the engineer's and architect's signed and stamped verification of seismic design codes, standards, and practices used in the design and construction of

[427] ENGEO, 2009.

the buildings, or submittal of Planning Department and/or DBI permit review and inspection documents to HUD. Compliance with mitigation measure MM GE-4a.2 would ensure that all appropriate documentation is submitted to HUD, if requested. Implementation of this mitigation and MM GE-5a would ensure that the impact to Alice Griffith Housing from settlement would be less than significant.

Yosemite Slough Bridge

The Yosemite Slough bridge could be exposed to settlement hazards. Unstable subsurface materials, such as artificial fill or soft Bay Mud deposits are abundant in the Candlestick Point site (refer to Figure III.L-1). Slight to severe damage to structures could occur caused by the settlement of poorly compacted fill or consolidation of very soft natural deposits.

Design and construction of the bridge would incorporate appropriate engineering practices, as required by BOE Standard Specifications Part 4 (Structures) and Part 7 (Excavation, Backfill, and Embankment) and would be based on Caltrans specifications. Implementation of mitigation measure MM GE-4a.3, would ensure that the design of the bridge would be based on Caltrans specifications (*Bridge Design Specifications*, Sections 3, 4, 5, and 23 of *Bridge Memos to Designers*), and would meet the BOE requirements. Implementation of mitigation measures MM GE-5a and MM GE-4a.3 would ensure the potential damage from unstable subsurface soils would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact GE-9b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by damage from settlement. (Less than Significant with Mitigation) *[Criterion L.c]***

The potential for exposure to adverse effects caused by settlement in the HPS Phase II site exists. Poorly consolidated artificial fill deposits are abundant in the HPS Phase II site. Slight to severe damage to structures could occur caused by the settlement of poorly compacted fill or consolidation of very soft natural deposits. Extensive Young Bay Mud deposits are predominant in Parcels D and E. The rate of settlement of the Young Bay Mud from the load of the artificial fill is now very small, but any increase in loads, whether resulting from placement of new fill or the construction of buildings, would initiate a new cycle of consolidation settlement.[428,429] The Young Bay Mud is underlain by firmer soils and bedrock that are not subject to settlement hazards. Where the site is underlain by Young Bay Mud subject to consolidation settlements under new fill loads, the planned development primarily includes open space and parking areas. These areas generally could tolerate a greater amount of consolidation settlement without serious risk because there would be no major structures or utilities to be affected. Gravity utilities can be designed to accommodate a certain amount of planned settlement.

Design and construction of structures and facilities in the HPS Phase II site would incorporate appropriate engineering practices, as required by Chapter 16 (Structural Design) and Chapter 18 (Soils and Foundations) of the SFBC. Sections 1607 through 1614 contain the formulae, tables, and graphs by which the Project engineer would develop the structural specifications for building design and which would be used by DBI to verify the applicability of the specifications. Sections 1804 through 1812 contain similar

[428] ENGEO, 2009.

[429] Engineering/Remediation Resources Group, Inc. and Shaw Environmental, Inc., 2009.

information for the design and verification of adequate soils and foundation support for a project. Section 1802 requires the use of this information in the soils analyses of the Project site.

Where shallow foundations would be underlain by poorly compacted artificial fill that may be subject to static settlement, it could be possible to employ a combination of removal and recompaction with the placement of geogrid beneath structures to help distribute differential settlement that might occur. Mid-rise and high-rise structures probably would be founded on deep foundations bearing in strata below the poorly compacted fill and soft Bay Mud deposits with flexible utility connections to allow some settlement beneath the buildings. If settlement estimates were such that the previously described treatments would not suffice, procedures outlined in mitigation measure MM GE-5a would avoid this impact or reduce it a less-than-significant level.

Selection of the appropriate ground improvement techniques would be dependent on the land use, development type, soil profile, and estimated settlement, as outlined previously in Table III.L-7 and Table III.L-8.[430] Implementation of mitigation measure MM GE-5a would ensure Project compliance with the requirements of the SFBC and would ensure that potential impacts from unstable subsurface soils would be less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-9 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by damage from settlement. (Less than Significant with Mitigation) *[Criterion L.c]***

The potential for adverse effects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level.

Impact GE-10: Soil Hazard—Expansive Soils

Impact of Candlestick Point

Impact GE-10a **Implementation of the Project at Candlestick Point, including Alice Griffith Housing and the Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by expansive soils. (Less than Significant with Mitigation) *[Criterion L.d]***

Candlestick Point

The Candlestick Point site could be exposed to expansive soil hazards, which can cause damage to structures, foundations and buried utilities and can increase required maintenance. Expansion and contraction of soils in response to changes in moisture content can cause differential and cyclical movements that can cause damage and/or distress to structures and equipment.

[430] ENGEO, 2009.

Soils at the Candlestick Point site are predominantly Orthents, cut and fill, Urban land and Urban land Orthents, with some Barnabe-Candlestick complex soils in the upland areas. These soils have various levels of risk for expansion.[431] Impacts related to expansive soils would be avoided or reduced a less-than-significant level for structures and facilities in the Candlestick Point site through the implementation of standard engineering and geotechnical practices for the identification and remediation of expansive soils, as required by Chapter 18 (Soils and Foundations) of the SFBC.

To avoid or reduce the potential impact from expansive soils at the Candlestick Point site, the following mitigation shall be implemented:

MM GE.10a *Site-Specific Geotechnical Investigation with Expansive Soils Analyses. Prior to issuance of building permits for the Project site:*

- *The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC). In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure soils stability, including reduction of potential soil expansion hazards.*
- *DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.*
- *All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.*
- *The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce expansive soils hazards. The engineering design techniques to reduce expansive soils hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of expansive soils and potentially unstable soils and shall identify means to avoid the hazard or support the design of engineering procedures to stabilize the soils, as required by Chapter 18 (Soils and Foundations) of the SFBC. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project's soil-stability specifications, including the appropriate foundation designs for structures on expansive soils and which would be used by DBI to verify the applicability of the specifications. If the presence of expansive soils is identified, appropriate support and protection procedures shall be designed and implemented to maintain the stability of soils adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities at the Project site.*
- *The Project CEG or GE shall be responsible for ensuring compliance with these requirements.*

[431] NRCS (accessed April 2008).

Implementation of this measure would ensure that hazards caused by the potential effects of expansive soils would be less than significant.

Alice Griffith Public Housing

The Alice Griffith Public Housing site could be exposed to hazards from expansive soils. New development on the Alice Griffith Public Housing site would be subject to HUD approval and Executive Order 12699. The new development would be subject to the SFBC, which would meet the requirements of the Executive Order. The San Francisco Department of Building Inspection (DBI) would be the agency responsible for implementing and enforcing appropriate seismic design and construction standards for the new development. DBI would be the City's responsible agency. Federal implementation and enforcement of the seismic safety program would be achieved through notification by the City to the building owner, architect, engineer, or contractor of the required minimum standards and requiring written acknowledgement of awareness of the requirements and of intent to comply.

HUD could require some form of compliance certification, such as the engineer's and architect's signed and stamped verification of seismic design codes, standards, and practices used in the design and construction of the buildings, or submittal of Planning Department and/or DBI permit review and inspection documents to HUD. Compliance with mitigation measure MM GE-4a.2 would ensure that all appropriate documentation is submitted to HUD, if requested. Implementation of this mitigation, as well as MM GE-10a, would ensure that the impact to Alice Griffith Housing from expansive soils would be less than significant.

Yosemite Slough Bridge

The Yosemite Slough bridge could be exposed to expansive soil hazards, which can cause damage to structures, foundations and buried utilities and can increase required maintenance. Expansion and contraction of soils in response to changes in moisture content can cause differential and cyclical movements that can cause damage and/or distress to structures and equipment.

Soils at Candlestick Point are predominantly Orthents, cut and fill, Urban Land and Urban Land Orthents. These soils have various levels of risk for expansion.[432] Impacts related to expansive soils would be rendered less than significant for the bridge through the implementation of standard engineering and geotechnical practices for the identification and remediation of expansive soils, as required by BOE Standard Specifications Part 7 (Excavation, Backfill, and Embankment). The design of the bridge would be based on Caltrans specifications, as required by mitigation measure MM GE-4a.3. Implementation of mitigation measures MM GE-10a and MM GE-4a.3 would reduce the impact from expansive soils on the Yosemite Slough bridge a less-than-significant level.

[432] NRCS (accessed April 2008).

Impact of Hunters Point Shipyard Phase II

Impact GE-10b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by expansive soils. (Less than Significant with Mitigation) *[Criterion L.d]***

The HPS Phase II site has the potential to expose Project improvements to adverse effects caused by expansive soils. Expansive soils can cause damage to structures, foundations and buried utilities and can increase required maintenance. Expansion and contraction of soils in response to changes in moisture content can cause differential and cyclical movements that can cause damage and/or distress to structures and equipment.

Soils at HPS Phase II are predominantly Orthents, cut and fill, Urban land and Urban land Orthents, with some Barnabe-Candlestick complex soils in the upland areas. These soils have various levels of risk for expansion.[433] Impacts related to expansive soils would be avoided or reduced a less-than-significant level for structures and facilities in the HPS Phase II site through the implementation of standard engineering and geotechnical practices for the identification and remediation of expansive soils, as required by Chapter 18 (Soils and Foundations) of the SFBC. Implementation of mitigation measure MM GE-10a would avoid or reduce the impact to structures and facilities at HPS Phase II from expansive soils a less-than-significant level by ensuring compliance with the SFBC.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-10 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by expansive soils. (Less than Significant with Mitigation) *[Criterion L.d]***

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level.

Impact GE-11; Soil Hazard—Corrosive Soils

Impact of Candlestick Point

Impact GE-11a **Implementation of the Project at Candlestick Point, including Alice Griffith Housing and the Yosemite Slough bridge, would not expose people or structures to substantial adverse effects caused by corrosive soils. (Less than Significant with Mitigation) *[Criterion L.c]***

Candlestick Point

Structures at Candlestick Point could be exposed to corrosive soil hazards. Problematic soils, including corrosive minerals and corrosive saline groundwater, can cause damage to structures, foundations and buried utilities, and can increase maintenance needs. Depending on the degree of corrosivity of subsurface

[433] NRCS (accessed April 2008).

soils, concrete and reinforcing steel in concrete structures and bare-metal structures exposed to these soils can deteriorate, eventually leading to structural failure.

Soils at Candlestick Point are predominantly Orthents, cut and fill, Urban land and Urban land Orthents, with some Barnabe-Candlestick complex soils in the upland areas. These soils have a moderate risk of soil corrosivity to concrete and steel.[434] Impacts related to corrosive soils would be rendered less than significant for structures and facilities in the Candlestick Point site through the implementation of standard engineering and geotechnical practices for the identification and remediation of corrosive soils, as required by Chapter 18 (Soils and Foundations) of the SFBC.

MM GE-11a *Site-Specific Geotechnical Investigation with Corrosive Soils Analyses. Prior to issuance of building permits for the Project site:*

- *The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC). In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure soils stability, including reduction of potential hazards from corrosive soils.*
- *DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.*
- *All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.*
- *The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce potential hazards from corrosive soils. The engineering design techniques to reduce corrosive soils hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of corrosive soils and shall identify means to avoid the hazard, as required by Chapter 18 (Soils and Foundations) of the SFBC. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project's structural design specifications, including the appropriate foundation designs for structures on corrosive soils and which would be used by DBI to verify the applicability of the specifications. If the presence of corrosive soils is identified, appropriate protection procedures shall be designed and implemented to minimize potential for damage from corrosive soils to structures and facilities at the Project site.*
- *The Project CEG or GE shall be responsible for ensuring compliance with these requirements.*

Implementation of mitigation measure MM GE-11a would ensure compliance with the requirements of the SFBC and would avoid or reduce the potential for damage from corrosive soils a less-than-significant level.

[434] NRCS (accessed April 2008).

Alice Griffith Public Housing

New development at the Alice Griffith Public Housing site could be exposed to corrosive soil hazards. New development on the Alice Griffith Public Housing site would be subject to HUD approval and Executive Order 12699. The new development would be subject to the SFBC, which would meet the requirements of the Executive Order. The San Francisco Department of Building Inspection (DBI) would be the agency responsible for implementing and enforcing appropriate seismic design and construction standards for the new development. DBI would be the City's responsible agency. Federal implementation and enforcement of the seismic safety program would be achieved through notification by the City to the building owner, architect, engineer, or contractor of the required minimum standards and requiring written acknowledgement of awareness of the requirements and of intent to comply.

As the HUD lead agency, the Mayor's Office of Housing could require some form of compliance certification, such as the engineer's and architect's signed and stamped verification of seismic design codes, standards, and practices used in the design and construction of the buildings, or submittal of Planning Department and/or DBI permit review and inspection documents to the Mayor's Office of Housing. Compliance with mitigation measure MM GE-4a.2 would ensure that all appropriate documentation is submitted to the Mayor's Office of Housing, if requested. Implementation of this mitigation and MM GE-11a would ensure that the impact to Alice Griffith Housing from corrosive soils would be less than significant.

Yosemite Slough Bridge

The Yosemite Slough bridge could be exposed to corrosive soil hazards. Problematic soils, including corrosive minerals and corrosive saline groundwater, can cause damage to structures, foundations and buried utilities and can increase required maintenance. Depending on the degree of corrosivity of subsurface soils, concrete and reinforcing steel in concrete structures and bare-metal structures exposed to these soils can deteriorate, eventually leading to structural failure.

Soils in the proposed Candlestick Point site are predominantly Orthents, cut and fill, Urban land and Urban land Orthents. These soils have a moderate risk of soil corrosivity to concrete and steel.[435] Impacts related to corrosive soils would be rendered less than significant for the bridge through the implementation of standard engineering and geotechnical practices for the identification and remediation of corrosive soils, as required by BOE Standard Specifications Part 7 (Excavation, Backfill, and Embankment). The design of the bridge would be based on Caltrans specifications, as required by mitigation measure MM GE-4a.3. Implementation of mitigation measures MM GE-11a and MM GE-4a.3 would reduce the impact from corrosive soils on the Yosemite Slough bridge a less-than-significant level.

[435] NRCS (accessed April 2008).

Impact of Hunters Point Shipyard Phase II

Impact GE-11b **Implementation of the Project at HPS Phase II would not expose people or structures to substantial adverse effects caused by corrosive soils. (Less than Significant with Mitigation) *[Criterion L.c]***

Structures at HPS Phase II could be exposed to corrosive soil hazards. Problematic soils, including corrosive minerals and corrosive saline groundwater, can cause damage to structures, foundations and buried utilities and can increase required maintenance. Depending on the degree of corrosivity of subsurface soils, concrete and reinforcing steel in concrete structures and bare-metal structures exposed to these soils can deteriorate, eventually leading to structural failure.

Soils in the HPS Phase II site are predominantly Orthents, cut and fill, Urban Land and Urban Land Orthents, with some Barnabe-Candlestick complex soils in the upland areas. These soils have a moderate risk of soil corrosivity to concrete and steel.[436] Impacts related to corrosive soils would be rendered less than significant for structures and facilities in the HPS Phase II site through the implementation of standard engineering and geotechnical practices for the identification and remediation of corrosive soils, as required by Chapter 18 (Soils and Foundations) of the SFBC. Implementation of mitigation measure MM GE-11a would ensure compliance with the requirements of the SFBC and would avoid or reduce the impact on structures and facilities in HPS Phase II a less-than-significant level.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact GE-11 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by corrosive soils. (Less than Significant with Mitigation) *[Criterion L.c]***

The potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from corrosive soils a less-than-significant level.

Impact GE-12: Surface Fault Rupture

Impact GE-12 **Implementation of the Project would not expose people or structures to substantial adverse effects caused by surface fault rupture. (No Impact) *[Criterion L.a(i)]***

Fault rupture hazards in the Project site are unlikely. Ground rupture occurs most commonly along preexisting faults, which are zones of weakness, but can occur slowly as fault creep or more suddenly as the result of major stress release along the fault plane (earthquakes). Where rupture occurs near buildings or other facilities, there is a potential for injury to persons and significant economic loss because of structural damage.

[436] NRCS (accessed April 2008).

The Hunters Point shear zone, north of Candlestick Point, is considered inactive. No known active faults cross the Project site, making hazards from fault rupture unlikely.[437] Therefore, there would be no impact caused by surface fault rupture. No mitigation is required.

Impact GE-13: Septic Tanks or Alternative Wastewater Disposal Systems

Impact GE-13 **Implementation of the Project would not result in the use of soils incapable of adequately supporting septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater. (No Impact) *[Criterion L.e]***

The Project would be connected to the City's existing wastewater treatment and disposal system. Development of the Project would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur. No mitigation is required.

Impact GE-14: Unique Geologic Features

Impact GE-14 **Implementation of the Project would not result in a substantial change of topography or destruction of unique geologic features. (No Impact) *[Criterion L.f]***

Most of the Project site is relatively flat, with elevations generally ranging from approximately 0 feet to 20 feet SFCD, because the site consists of fill areas or low lying shoreline areas. Maximum ground surface elevation near the Project site is on Bayview Hill (west of Candlestick Point), which reaches an elevation of approximately 400 feet SFCD. The Jamestown Avenue area of Candlestick Point is at about 75 feet in elevation. There are no unique geologic features, such as prominent hills, exceptional rock outcroppings, or similar features.

The Project would alter surface topography for new development, including about three feet of fill in some areas. The HPS Phase II shoreline would be altered with new seawalls or other shoreline protection. The Project would not substantially change site topography or affect unique geologic features, and would have no impact on such features. No mitigation is required.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts resulting from geologic hazards is generally site-specific, because each Project site has a different set of geologic considerations that would be subject to specific site-development and construction standards. Soil and geologic conditions are site-specific and there is little, if any, cumulative relationship between the Project and other areas in the City. As such, the potential for cumulative impacts to occur is geographically limited for many geology and soils impact analyses; however, variations from a site-specific cumulative context are identified, where they occur.

In common with the rest of California, San Francisco is in a seismically active area and is subject to risk of damage to persons and property as a result of seismic groundshaking. Given the risk from seismic activity associated with all development in seismically active areas, this impact would be significant if it were not

[437] GTC, 2005.

mitigated by building code requirements. Building in California is strictly regulated by the CBC, as adopted and enforces by each jurisdiction, to reduce risks from seismic events to the maximum extent possible. Impacts associated with potential geologic hazards related to fault rupture would occur at individual building sites and would be related to the site's location relative to fault zones, the composition of the site's soil, and the structural strength of a particular building. The Project site is not in an Alquist-Priolo fault zone, and no known active faults cross the Project site, making hazards from fault rupture unlikely. The Hunters Point Shear Zone, which crosses the HPS Phase II site in the northwest, is considered inactive, as noted above.

Because the City uses and enforces the requirements of the CBC as part of the SFBC, new buildings and facilities in the City are required to be sited and designed in accordance with the most current geotechnical and seismic guidelines and recommendations. In addition, the Project would implement all necessary design features recommended by the site-specific geotechnical studies to reduce the risk from liquefaction, settlement, lateral spreading, expansive or corrosive soils, and landslides. With implementation of the previously noted mitigation measures and adherence to the SFBC and related plans, regulations, and design and engineering guidelines and practices, the Project would not make a cumulatively considerable contribution to any potential cumulative impact arising from fault rupture. The Project's cumulative impact would be less than significant.

Impacts associated with potential geologic hazards related to groundshaking and seismic-related ground failure would occur at individual building sites. These effects are site-specific, and impacts would not be compounded by additional development. New buildings and facilities in the City are required to be sited and designed in accordance with appropriate geotechnical and seismic guidelines and recommendations, consistent with the requirements of the SFBC. Therefore, although there is risk from seismic events inherent in all development in seismically active areas in the state of California, compliance with applicable regulations reduces this risk. The Project would comply with the SFBC, San Francisco Department of Public Works regulations, the California *Seismic Hazards Mapping Act*, and other agency specifications for new structures. These regulations have been formulated to preserve public safety. The Yosemite Slough bridge design and construction would be required to meet state and local regulations related to protecting against geologic and seismic hazards, including Caltrans *Bridge Design Specifications*, *Bridge Memo to Designers*, *Bridge Design Practice Manual*, and *Bridge Design Aids Manual*. As a result of implementation of these standards, the Project's potential impacts from geological hazards would be avoided and/or reduced a less-than-significant level.

Because the project would comply with the provisions of all applicable codes and regulations and because its building plans would conform to the most current seismic safety design guidelines, the Project would not make a cumulatively considerable contribution to any potential cumulative impacts arising out of strong seismic groundshaking, and the cumulative impact would be less than significant.

The impacts from erosion and loss of topsoil from site development and operation can be cumulative in effect within a watershed. Based on historic drainage patterns, watersheds in the Project vicinity that would form the geographic context for an analysis of erosion impacts are the Islais Creek Basin and the Yosemite Basin.[438] Development throughout the City is subject to runoff, erosion, and sedimentation prevention requirements, including the applicable provisions of Phases I and II of the NPDES permit process and

[438] San Francisco Public Utilities Commission, *Urban Watershed Planning Charrette, Bayside Basins Summary Report*, May 2008.

implementation of fugitive dust control measures in accordance with BAAQMD Rule 403. Construction activities would be required to comply with all code requirements, including surface soil erosion control. Any erosion potential would be reduced or avoided through compliance with applicable codes and mitigation measures. Because all development in the watershed would be subject to these provisions, cumulative impacts related to erosion or the loss of topsoil would not be significant.

Implementation of the Project would modify soil and topographic conditions at the site to accommodate development and provide a stable and safe physical environment. The construction phase of the Project could expose soil to erosion by wind or water. Development of other cumulative projects in the vicinity of the Project site, including the Yosemite Slough Restoration Project, could expose soil surfaces and further alter soil conditions. To minimize the potential for cumulative impacts that could cause erosion, the Project and cumulative projects in the adjacent area are required to conform to the provisions of applicable federal, state, County, and City laws and ordinances. Because the Project would be in compliance with applicable BAAQMD and NPDES permit requirements, and would implement and maintain the BMPs required by the Project's SWPPP, the Project would not make a cumulatively considerable contribution to any potential cumulative impact related to soil erosion or loss of topsoil, and the cumulative impact of the Project would be less than significant.

As with seismic groundshaking impacts, the geographic context for analysis of impacts on development from unstable soil conditions, including landslides, liquefaction, subsidence, collapse, or expansive or corrosive soils generally is site-specific. Because all development is required to undergo analysis of geological and soil conditions applicable to the specific individual project, and because restrictions on development would be applied in the event that geological or soil conditions pose a risk to safety, it is anticipated that cumulative impacts from development on soils subject to instability, subsidence, collapse, and/or expansive soil would be less than significant. Because the Project would implement the identified mitigation measures, the Project would not make a cumulatively considerable contribution to any potential cumulative impacts, and the cumulative impact of the Project would be less than significant.

Cumulative projects, depending on where they are located, could substantially change site topography and/or unique geologic or physical features at their respective sites. In certain situations this could be a potentially significant impact, particularly if a large number of cumulative projects were to change topography or unique geologic features. Nothing in the Project site circumstance or the surrounding area suggests that such a cumulative impact could occur. Most of the Project site is relatively flat, with elevations ranging from approximately 0 feet to 20 feet SFCD, because the site consists of fill areas or low lying shoreline areas. Maximum ground surface elevation near the Project site is on Bayview Hill (west of Candlestick Point), which reaches an elevation of approximately 400 feet SFCD. The Jamestown Avenue area of Candlestick Point is at about 75 feet SFCD in elevation. There are no unique geologic features, such as prominent hills, exceptional rock outcroppings, or similar features. The Project would alter surface topography for new development, including about three feet of fill in some areas. The HPS Phase II shoreline would be altered with new seawalls or other shoreline protection. Overall, the Project would not substantially change site topography or affect unique geologic features, and would have no impact on such features. Therefore, there is no cumulative impact related to topography and unique geographic features.

SECTION III.M HYDROLOGY AND WATER QUALITY

III.M.1 Introduction

This section describes the existing hydrology and water quality conditions within the Project site and vicinity and evaluates the potential for the Project to result in environmental impacts related to surface and groundwater quality, stormwater drainage, and flooding. This section discusses construction and operational impacts associated with stormwater runoff, combined sewer overflows, flood risk (including potential effects from future sea level rise and seismically induced events), marina basin dredging, and Yosemite Slough bridge construction. This section identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts. Potential water quality impacts associated with hazardous materials are discussed in Section III.K (Hazards and Hazardous Materials). Potential impacts to biological resources from water quality impacts are discussed in Section III.N (Biological Resources).

Information sources for the analysis presented in this section include contacts with public agency staff and reference documents from the State Water Resources Control Board (SWRCB), the California Department of Water Resources (DWR), the San Francisco Bay Regional Water Quality Control Board (SFRWQCB), the San Francisco Bay Conservation and Development Commission (BCDC), the Association of Bay Area Governments (ABAG), the Federal Emergency Management Agency (FEMA), the San Francisco Public Utilities Commission (SFPUC), and several City departments. Related plans and policies are discussed, including the *San Francisco Bay Basin Water Quality Control Plan* (Basin Plan),[439] the *City and County of San Francisco Stormwater Management Plan* (January 2004),[440] *San Francisco Bay Plan*,[441] the *Draft San Francisco Stormwater Design Guidelines*.[442] In addition, the Baseline Stormwater calculations conducted by PBS&J (refer to Appendix M1 [Stormwater Runoff Calculations]) and several technical reports and analyses prepared by consultants on behalf of Lennar Urban were used during the preparation of this section, and are listed as cited sources.

III.M.2 Setting

Regional Hydrology

The Bay Area climate is generally characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and relatively warm dry summers. San Francisco exemplifies a particular type of Mediterranean climate that, due to the proximity of coastal waters, experiences cool, often cloudy summers. The approximate annualized average high temperature is 64 degrees Fahrenheit (ºF); the average low temperature is 51ºF. The average annual rainfall in the vicinity of the Project site, for the period between 1914 and 2008, is approximately 21.1 inches, the majority of which occurs from

[439] San Francisco Regional Water Quality Control Board, *San Francisco Bay Basin Water Quality Control Plan (Basin Plan)*, As amended, January 18, 2007. Available: http://www.swrcb.ca.gov/sanfranciscobay/basin_planning.
[440] City and County of San Francisco, *Stormwater Management Plan*, January, 2004.
[441] San Francisco Bay Conservation and Development Commission, *San Francisco Bay Plan*, June 1998.
[442] City of San Francisco, San Francisco Public Utilities Commission and Port of San Francisco, *Draft – San Francisco Stormwater Design Guidelines*, 2009.

October through April.[443] During the period of record, annual rainfall has varied from 8.7 inches (1976) to 43.8 inches (1983), with a one-day high of 5.5 inches of precipitation on November 5, 1994. Analysis of long-term precipitation records indicates that wetter and drier cycles lasting several years are common in the region. Severe, damaging rainstorms occur at a frequency of about once every three years.[444]

San Francisco Bay (Bay) borders the Project site to the north, east, and south. The amount and timing of precipitation, air temperature, tidal cycle, and wind patterns influence the Bay's freshwater inflow, salinity, currents, and suspended sediments. The Bay is subject to strong westerly winds, which exert stress on the water surface generating waves. Wind-generated waves suspend sediments creating turbid conditions and dispersing sediments throughout the Bay. Candlestick Point and HPS Phase II are located on peninsulas that extend into the Bay, (refer to Figure III.M-1 [Combined and Separate Storm Sewer System and Receiving Water Bodies]). Yosemite Slough, a tidal inlet, and South Basin, an embayment,[445] separate Candlestick Point and HPS Phase II.

The portion of the Bay east of the Project site is referred to in the San Francisco Bay Basin Water Quality Control Plan (Basin Plan) as the San Francisco Bay Lower (Lower Bay) in the South Basin Hydrologic Planning Area. Major water features along the Lower Bay shoreline in the vicinity of the Project site, from north to south, include Islais Creek Channel, India Basin, South Basin, Yosemite Slough, and Candlestick Cove (refer to Figure III.M-1). Freshwater flow into the South Basin is limited to flow from creeks and stormwater outfalls.[446] Circulation is limited because the basin's location restricts exposure to tidal action, especially when compared to other portions of the Bay. In constricted areas such as Islais Creek and Yosemite Slough, circulation is even more limited than in India Basin, South Basin, and Candlestick Cove. The San Francisco Bay Central (Central Bay) to the north has better circulation than the Lower Bay because of constant mixing of freshwater from the Sacramento/San Joaquin Delta and saltwater from the Pacific Ocean.

Watersheds and Surface Water Bodies

Project Site Watersheds

Precipitation drains as surface runoff into a network of underground and surface drainage pathways. Generally, these pathways converge into drainage culverts, streams, and/or creeks, which become progressively larger as the runoff moves downstream, eventually reaching a common discharge location. The terms "watershed" or "drainage basin" describe the area of land that drains downslope to such a location.

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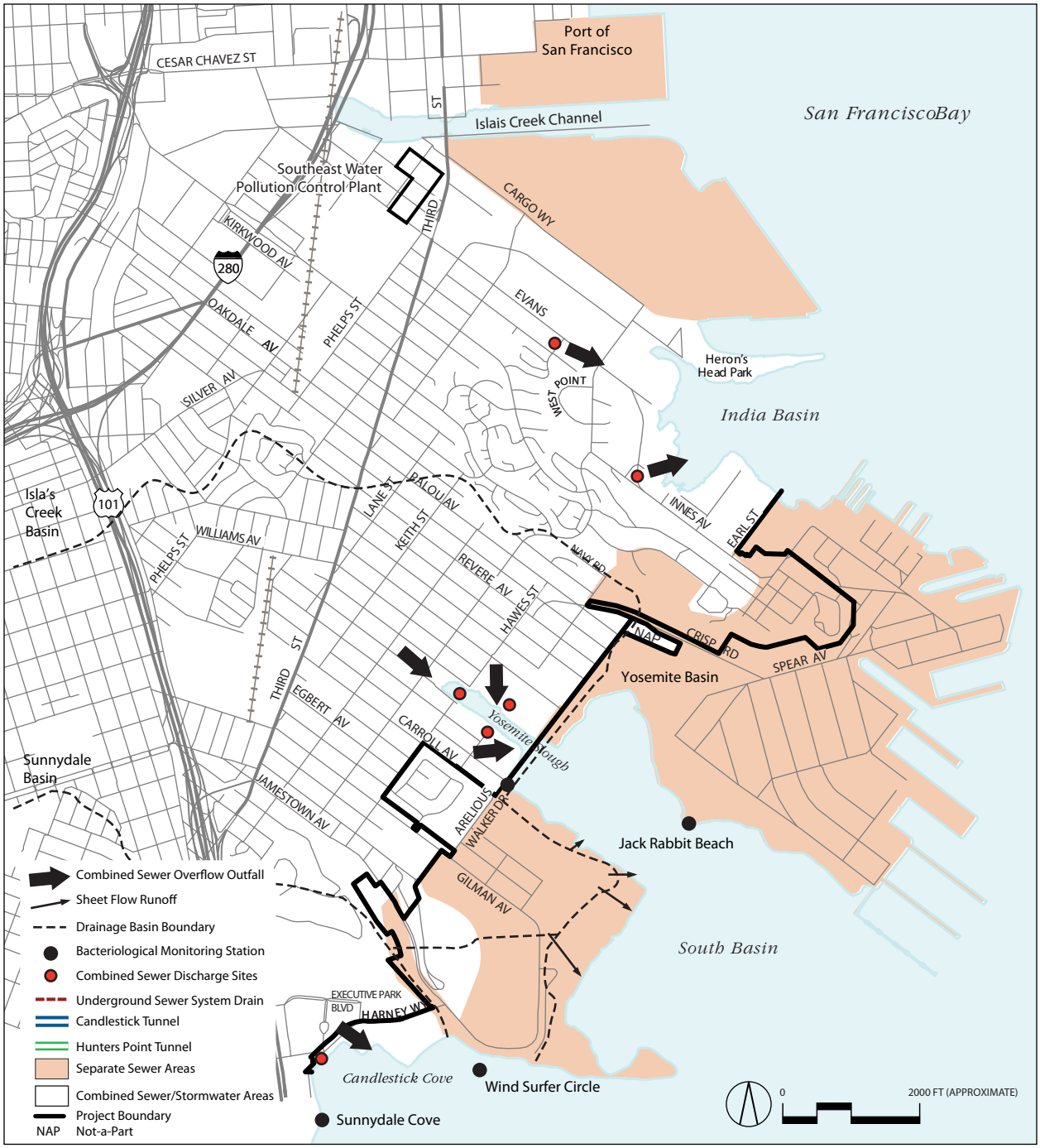
[443] Western Regional Climate Center, website: General Climate Summary: San Francisco Mission Dolores Station (047772), website: www.wrcc.dri.edu, accessed July 20, 2009.
[444] Brown, William M. III, 1988, *Historical Setting of the Storm: Perspectives on Population, Development, and Damaging Rainstorms in the San Francisco Bay Region, in Landslides, Floods, and Marine Effects of the Storm of January 3-5, 1982, in the San Francisco Bay Region, California*, Stephen D. Ellen and Gerald F. Wieczorek, Eds., US Geological Survey Professional Paper 1434.
[445] An embayment is a small bay or any small semi-enclosed coastal water body whose opening to a large body of water is restricted.
[446] An outfall is a pipe that discharges treated stormwater and wastewater flows into a receiving water body.



SOURCE: SFPUC, Maps and Resources, Isla is Creek Basin: http://sfwater.org/mto_ma_cfm/mc_ID/14/MSC_ID/361/MTO_ID/565.

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FIGURE III.M-1

COMBINED AND SEPARATE STORM SEWER SYSTEM AND RECEIVING WATER BODIES

Historically, small creeks near the Project site, including Yosemite Creek and Islais Creek, flowed from the east side of the City to the Lower Bay, forming the Islais Creek Basin and the Yosemite Basin.[447] However, most of the creeks in San Francisco were filled or converted to underground drains during development of the City, and as a result, there are no natural freshwater bodies or streams within the Project site.[448] Development has obscured and modified the historic drainage basin boundaries. Figure III.M-1 shows drainage basins in the Bayview Hunters Point neighborhood based on current hydrological conditions.

Islais Creek Basin

The Islais Creek Basin encompasses ten square miles,[449] and includes the northern portion of HPS Phase II. Islais Creek originates in Glen Canyon, over three miles west and slightly north of the Project site. The only remaining surface extents of the historic creek channel are in Glen Canyon and at the San Francisco Bay waterfront near the foot of Potrero Hill and Cesar Chavez Street. Flows from Islais Creek are conveyed to the combined sewer system. Surface inflow to Islais Creek Channel occurs during the rainy season from direct stormwater runoff from areas adjacent to the channel and from treated wastewater discharged from the combined sewer system (described in more detail below) through the Quint Street outfall. Four deep water combined sewer overflow (CSO) structures[450] are also located along the Islais Creek Channel.[451]

Yosemite Basin

The Yosemite Basin encompasses approximately three square miles[452] and contains the southern portion of HPS Phase II and Candlestick Point. Yosemite Creek historically originated from a hilltop spring in McLaren Park and ran through what are now the Portola and Bayview neighborhoods before discharging into San Francisco Bay via Yosemite Slough. The creek is culverted and channelized, and the channel receives direct stormwater runoff from areas adjacent to the channel and from two CSO structures with nearshore discharges.

Surface Water Bodies

Yosemite Slough

Yosemite Slough is located along the southwestern shoreline of HPS Phase II and along the northern shoreline of Candlestick Point. Historically, Yosemite Slough was part of a much broader tidal marsh and mudflat complex that served as the transition between Yosemite Creek to the west and the Bay to the east. Starting in the late 1800s, Yosemite Slough was filled for residential and industrial use, raising the ground surface to a level approximately 5 to 20 feet above sea level. Filling of the tidelands continued through the

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[447] San Francisco Public Utilities Commission, *Urban Watershed Planning Charrette, Bayside Basins Summary Report*, May 2008.
[448] Oakland Museum of California, *Creek and Watershed Map of San Francisco,* 2007.
[449] San Francisco Public Utilities Commission, *Urban Watershed Planning Charrette, Bayside Basins Summary Report*, May 2008.
[450] A combined sewer overflow (CSO) structure discharges flows that exceed the capacity of the combined sewer system during heavy rain. Such discharges receive primary (flow-through) treatment in underground storage/transport boxes. Refer to the description of the City's combined sewer system later in this section.
[451] San Francisco Redevelopment Agency and San Francisco Planning Department, *Bayview Hunters Point Redevelopment Projects and Rezoning Draft Environmental Impact Report*, October 19, 2004. File No. 1996.546E, p. III.M-3.
[452] San Francisco Redevelopment Agency and San Francisco Planning Department, *Bayview Hunters Point Redevelopment Projects and Rezoning Draft Environmental Impact Report*, October 19, 2004. File No. 1996.546E, p. III.M-3.

1960s, until the approximate current shoreline became established in 1972.[453] As noted above, surface inflow into the remnant channel of Yosemite Slough occurs during the rainy season from treated wastewater discharged from the combined sewer system through three nearshore CSO structures and from direct stormwater runoff from areas adjacent to the slough. A planned restoration of Yosemite Slough includes restoring 12 acres of upland fill back to tidally influenced wetlands. The restoration project is being implemented by the California State Parks Foundation in collaboration with local environmental groups.

South Basin

South Basin is located along the southern shoreline of HPS Phase II and the eastern shoreline of Candlestick Point. The South Basin is an embayment with direct and open tidal exchange with the Lower Bay. Yosemite Slough flows into South Basin from the west, and South Basin also receives stormwater discharges from separate drainage systems located in HPS Phase II and Candlestick Point.[454]

Candlestick Cove

Candlestick Cove is located along the southern shoreline of Candlestick Point. Historically, there were two small creeks flowing from the adjacent uplands to the Lower Bay in this vicinity; however, both creeks have been filled. This portion of the Lower Bay receives surface drainage from one nearshore CSO structure and from direct stormwater runoff and discharge from a separate storm sewer outfall.[455]

Groundwater Basins

Groundwater basins in the vicinity of the Project site, as defined in the Basin Plan, include (from north to south) Islais Valley (Basin ID: 2-33; area: 9.2 square miles), South San Francisco (Basin ID: 2-37; area: 3.4 square miles), and Visitacion Valley (Basin ID: 2-32 area: 9 square miles).[456] Hydrologic regions and basin identification numbers are designated by DWR.

Sources of recharge into the groundwater basins include infiltration of rainfall, landscape irrigation, and leakage from water, wastewater, and storm drain pipes. A study performed in 1993, found that the average groundwater recharge for the water years 1987 to 1988 was 1,836 acre-feet per year in Islais Valley, 696 acre-feet per year in South San Francisco, and 269 acre-feet per year in the Visitacion Valley groundwater basin.[457] Generally, the basins in the Project site, which are not used for water supply, have maintained stable groundwater levels.[458]

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[453] California Department of Parks and Recreation, 2006, Candlestick Point State Recreation Area, *Yosemite Slough Restoration Project, Initial Study Mitigated Negative Declaration*, June, page 6.
[454] San Francisco Redevelopment Agency and San Francisco Planning Department, *Bayview Hunters Point Redevelopment Projects and Rezoning Draft Environmental Impact Report*, October 19, 2004. File No. 1996.546E.
[455] San Francisco Redevelopment Agency and San Francisco Planning Department, *Bayview Hunters Point Redevelopment Projects and Rezoning Draft Environmental Impact Report*, October 19, 2004. File No. 1996.546E.
[456] California Regional Water Quality Control Board San Francisco Bay Region (Water Board), *2007, San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan)*, January 18.
[457] California Department of Water Resources (DWR), *California's Groundwater Bulletin 118, Update 2003*.
[458] California Department of Water Resources (DWR), *California's Groundwater Bulletin 118, Update 2003*.

Stormwater Drainage

Combined Sewer System

Facilities and Operation

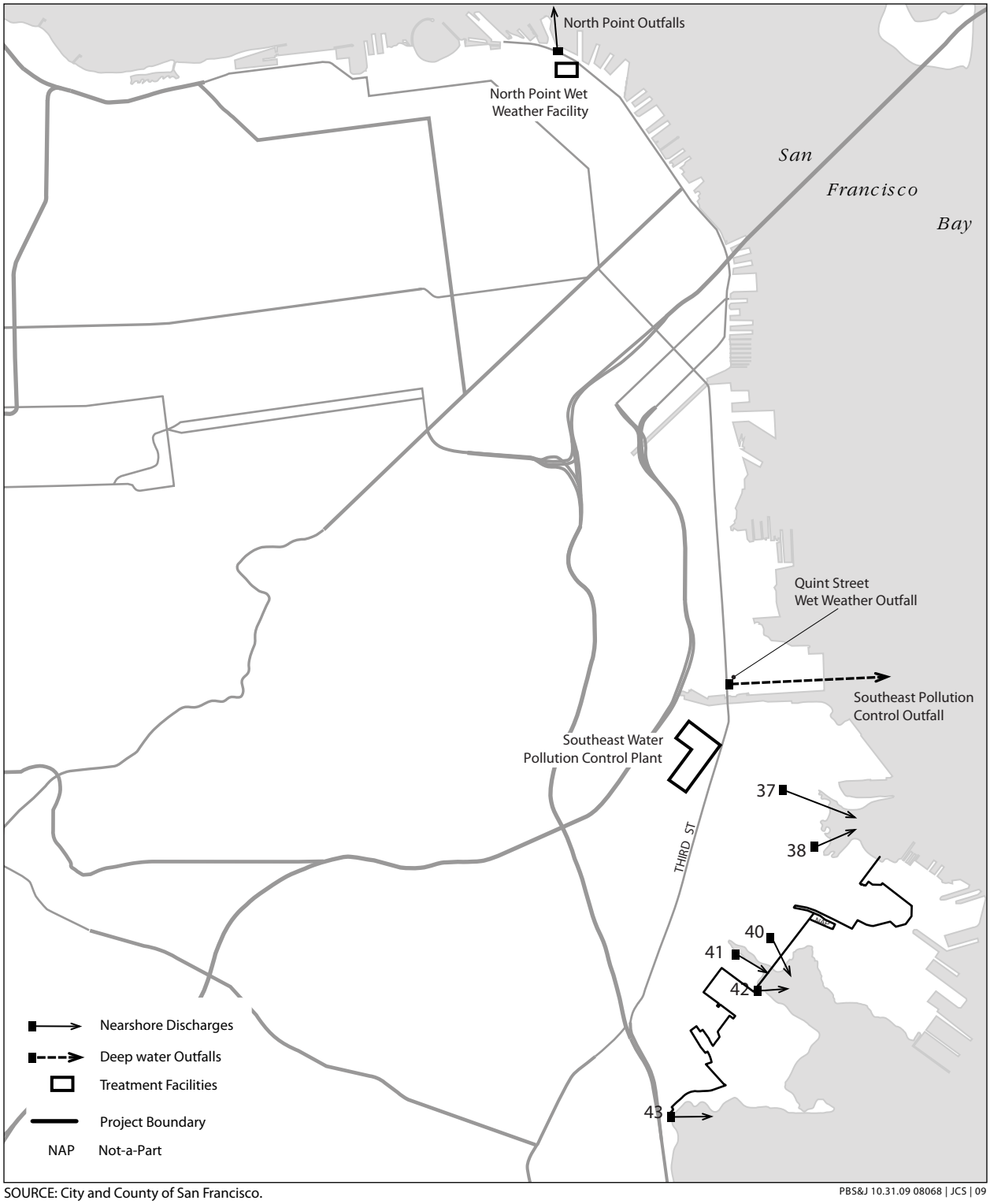
Most stormwater runoff in the City is collected via a combined sewer system managed by the SFPUC. This system combines stormwater runoff and wastewater flows in the same network of pipes, conveying flows to facilities where they are treated prior to discharge to the Lower Bay or Pacific Ocean through outfall structures along the shoreline. Discharges from the combined sewer system are regulated under two individual National Pollutant Discharge Elimination System (NPDES) permits (waste discharge requirements [WDRs]) issued by the SFRWQCB. The Project site discharges to east side facilities that discharge to the Lower Bay. The applicable NPDES Permit/WDR is discussed in the Regulatory Setting section.

The combined sewer system is designed to ensure that most wastewater receives secondary treatment (removal of settleable materials and partial removal of dissolved materials). During dry weather, wastewater and any dry-weather runoff (e.g., from irrigation runoff, discharge from underground springs, or pipe leaks) from the eastern portions of the City is conveyed to the Southeast Water Pollution Control Plant (SWPCP), at Phelps Street between Jerrold and Evans Avenues, just northwest of the Project site (refer to Figure III.M-2 [Existing SFPUC Major Water Quality Features]). The SWPCP treats approximately 67 million gallons per day (MGD) during dry weather (approximately 80 percent of the City's total wastewater flow)[459] and has the capacity to treat 150 MGD to a secondary treatment standard. Secondary treatment uses pure oxygen to encourage growth of microorganisms that consume organic material and improve the purity of the wastewater. Wastewater is then put into a second round of settling tanks where the microorganisms are separated from the cleaned water, and disinfected. Treated, dechlorinated wastewater is then discharged through the Southeast Plant deep water outfall at Pier 80.

If the combined wet-weather flows exceed 150 MGD, the plant can also treat an additional 100 MGD to a primary treatment standard (removal of settleable materials) plus subsequent disinfection and dechlorination.[460] Wet weather flows that are treated to the primary standard (plus disinfection) are only discharged from the Southeast Pollution Control Outfall (Pier 80 outfall), while flows treated to the secondary standard and disinfected are discharged through the Quint Street outfall to the Islais Creek Channel when maximum capacity of the plant is reached.

During larger storm events, excess flows that cannot be treated at the SWPCP are treated and discharged through the Bayside Wet Weather Facilities (BWWF), which consist of a series of interconnected underground tanks, tunnels, and outfall structures. During dry weather, the BWWFs transport combined wastewater to the SWPCP. During wet weather, the underground transport tunnels provide a total storage capacity of approximately 193 million gallons, while pumps continue to transfer combined wastewater and stormwater to the SWPCP. The BWWFs were designed, in accordance with the NPDES permit, to capture

[459] San Francisco Public Utilities Commission, website: http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/117/MTO_ID/225, accessed July 22, 2009.
[460] San Francisco Public Utilities Commission, 2008. *System Overview: Wastewater System Map.* Accessed online November 6, 2008 at: http://sfwater.org.



SOURCE: City and County of San Francisco.

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EXISTING SFPUC MAJOR WATER QUALITY FEATURES

FIGURE III.M-2

and store sufficient volumes of sewage and stormwater to limit discharges from the BWWF to specified long-term average numbers of annual discharges (CSOs). The Project site discharges to the system that was designed to achieve a long-term annual average of ten, eight, four, or one CSO events, depending upon location. When the treatment capacity of the SWPCP is fully maximized, the wet weather facilities retain storm flows for later treatment. The tanks allow floatable and settleable solid materials to be removed, similar to primary treatment processes. The materials retained in the storage and transport boxes are flushed to the treatment plants after storms. This level of treatment meets the minimum treatment specified by the US Environmental Protection Agency (USEPA) Combined Sewer Overflow Control Policy (CSO Policy) I50 FR 18688; April 11, 1994.

During very large storm events that cause flow to the SWPCP to exceed 110 MGD, and when the treatment and storage capacities of the combined system are exceeded, excess flows receive "flow-through treatment," similar to primary treatment, to remove settleable solids and floatable materials and flows are then discharged into the Lower Bay through any one of 29 CSO structures located along the City's Bayside waterfront from Fisherman's Wharf to Candlestick Point. The volume of a CSO discharge is a function of the storm intensity, storm duration, treatment rate, and available storage. CSO discharges typically consist of about 6 percent sewage and 94 percent stormwater.[461] All solids that settle out in the storage/transport structures are flushed to the SWPCP after the rainstorm. There are six CSO structures in the vicinity of the Project site, in Yosemite Slough/South Basin and Candlestick Cove (CSO-37 through CSO-43 as depicted on Figure III.M-2).

At Candlestick Point, the Candlestick Park stadium and Alice Griffith public housing site discharge stormwater runoff to the combined sewer system, while the Candlestick Point State Recreation Area (CPSRA) and portions of the stadium parking lots have separate storm sewer systems (refer to description below). Stormwater at HPS Phase II does not flow to the City's combined sewer system, but is discharged to the Bay via separate stormwater system outfalls and overland flows (refer to description below).

Current Combined Sewer System Planning Efforts

The SFPUC is preparing a long-term strategy for the management of the City's wastewater and stormwater, to be presented in a Sewer System Master Plan.[462] The Sewer System Master Plan will examine the capacity, condition, and long-term management strategies for the City's combined sewer system infrastructure and facilities.

As part of the long-term planning process, the SFPUC is examining alternative discharge options for treated combined sewer flows. In 2006, the SFPUC updated the Recycled Water Master Plan (described in the Regulatory Framework), to develop a terrestrial discharge option for treated wastewater for landscaping purposes. The Recycled Water Master Plan identifies where and how San Francisco could most feasibly develop recycled water in the City and provides a strategy for implementing the recycled water projects.[463]

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[461] City of San Francisco, San Francisco Public Utilities Commission, and Port of San Francisco, 2009, op. cit.
[462] City of San Francisco, San Francisco Public Utilities Commission, 2009. *SF Sewer System Master Plan Overview,* website: http://sfwater.org/msc_main.cfm/MC_ID/14/MSC_ID/120, accessed July 20, 2009.
[463] City of San Francisco, San Francisco Public Utilities Commission, 2009. *Our Recycled Water,* website: http://sfwater.org/mto_main.cfm/MC_ID/13/MSC_ID/375/MTO_ID/566, accessed December 9, 2008.

Separate Storm Sewer Systems

Approximately ten percent of the City is served by separate storm sewer systems or is lacking storm sewer infrastructure. Existing separate storm sewer systems do not generally provide treatment prior to discharge to the Lower Bay.[464] Similarly, in areas lacking storm sewer infrastructure, untreated surface runoff drains directly to the Bay.[465] The separate storm sewer systems are regulated under the NPDES, also discussed in the Regulatory Framework.

The portions of the Project site that have a separate storm sewer system are shown in Figure III.M-1. Approximately 47 acres surrounding the Candlestick Park stadium discharge to a separate storm sewer system.[466] The San Francisco Recreation and Park Department maintains the storm drain system for this area, including catch basins, piping, pump stations, and outfalls, and the SFPUC provides assistance on outfall maintenance. This storm sewer system is more than 30 years old, and historic flooding has occurred because of the inadequate capacity of the system.[467] Approximately 120.2 acres of the 154-acre Candlestick Park State Recreation Area (CPSRA) are within the Project site and are served by a separate storm sewer system, managed under the jurisdiction of the California Department of Parks and Recreation.[468]

HPS Phase II had a combined sewer system in the 1940s; however, the Navy implemented a series of projects in 1958, 1973, and 1976 to separate the wastewater and storm sewer systems. Most of HPS Phase II is served by the separate storm sewer system; however, areas along the shoreline drain directly to the Lower Bay via overland flow and subsurface migration of infiltrated water.[469] The Navy has obtained Waste Discharge Identification Number (241S011455) for HPS Phase II stormwater discharge under the Industrial General Permit (discussed in the Regulatory Framework). In accordance with this permit, HPS Phase II stormwater is discharged to San Francisco Bay through 33 storm water outfalls along the perimeter of HPS Phase II. HPS Phase II wastewater is conveyed to the SWPCP through a force main at Crisp Road.

Flood Protection

Flood management within the Project site is the responsibility of CPSRA and property owners (for Candlestick Point) and the Navy (for the HPS Phase II), who are responsible for the development and maintenance of flood protection facilities. The flood protection facilities primarily consist of stormwater collection systems and coastal protection features, including sea walls and various forms of shoreline armoring (such as rock rip-rap).

Dam Failure Inundation Risk

The Project site is not within a mapped dam failure inundation area (refer to Figure III.M-3 [Dam Failure Inundation Areas in the Project Vicinity]). However, an area adjacent to the Project site, between Yosemite Slough and US-101, has been mapped as a dam failure inundation zone for the University Mound Reservoir.

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[464] It should be noted, however, that proposed separate sewer systems at the Project site would include treatment mechanisms and BMPs.
[465] City of San Francisco, San Francisco Public Utilities Commission, and Port of San Francisco, 2009, *Draft San Francisco Stormwater Design Guidelines*, February 24.
[466] San Francisco Redevelopment Agency and San Francisco Planning Department, 2004, op. cit.
[467] Ibid.
[468] San Francisco Public Utilities Commission, *Storm Water Management Plan 2003-2004*, January 2004.
[469] City and County of San Francisco Planning Department and San Francisco Redevelopment Agency, *Hunters Point Shipyard Reuse Final Environmental Impact Report*, certified February 8, 2000. File No. 1994.061E.

Existing Flood Risk

The Federal Emergency Management Agency (FEMA) implements the National Flood Insurance Program (NFIP) under its Flood Insurance Administration, which prepares Flood Insurance Rate Maps (FIRMs) that identify areas subject to flood inundation, most often from a flood having a one percent chance of occurrence in a given year (also known as a "base flood" or "100-year flood"). FEMA refers to the portion of the floodplain or coastal area that is at risk from a flood of this magnitude as a Special Flood Hazard Area (SFHA). For SFHAs, FIRMs may specify the anticipated water surface elevation during the base flood, or Base Flood Elevation. When a Base Flood Elevation has not been formally established for a SFHA, the Base Flood Elevation may be estimated by a qualified engineer. In coastal areas, the Base Flood Elevation may be the equivalent of the height of tidal waters during an extreme high tide event, coupled with flooding from a large storm.

No FIRMs have been formally published by FEMA for the City; thus, the Base Flood Elevation for a 100-year flood event has not been formally established. However, on September 21, 2007, FEMA issued a preliminary FIRM for San Francisco, which tentatively identified SFHAs along the City's shoreline, including portions of the Project site.

Until finalization of the FIRMs, Interim Floodplain Maps have been prepared under the City's Floodplain Management Program to delineate SFHAs subject to the City's floodplain development requirements (see Regulatory section for details). The floodplain management regulations in this ordinance are consistent with the NFIP requirements for communities like San Francisco, where FEMA is in the process of preparing, but has not completed a final FIRM.

As shown on Figure III.M-4 (Preliminary 100-Year Flood Zones within and Adjacent to the Project), portions of Candlestick Point and HPS Phase II are within or adjacent to the following mapped 100-year flood hazard areas on the preliminary FIRM:

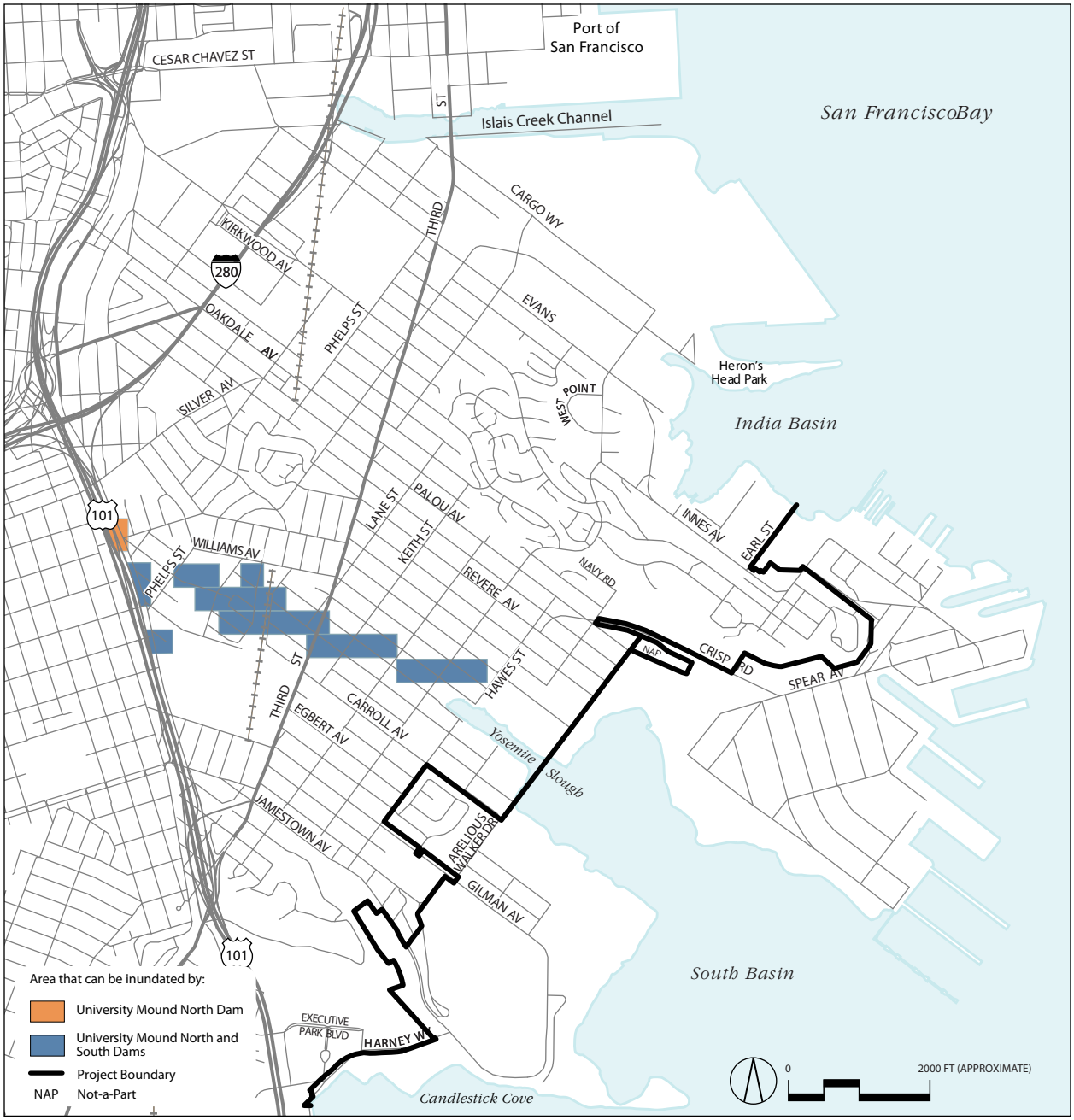
- Zone A: Areas with a one percent annual chance of flooding; no Base Flood Elevations determined
- Zone V: Coastal areas with a 1 percent or greater chance of flooding and an additional hazard associated with storm waves; no Base Flood Elevations determined[470]

Within the Project site, tidal flooding of the HPS Phase II storm drain system has been identified during high tides in low-lying areas throughout HPS Phase II. In addition, tidal flooding has also been identified within the storm drain system at Candlestick Point.

The extent of the Zone A SFHAs shown for the Project site on the preliminary FIRM and the City's Interim Floodplain Maps is essentially the same.[471] However, the City has submitted comments to FEMA on the preliminary FIRM requesting revision of the Zone V (coastal flooding area) SFHA designation.

[470] NFIP regulations require coastal communities to ensure that buildings built in Zone V are anchored to resist wind and water loads acting simultaneously. Buildings in Zone V are subject to a greater hazard than buildings built in other types of floodplains. Not only do they have to be elevated above the Base Flood Elevation, they must be protected from the impact of waves, hurricane-force winds and erosion.

[471] Linda Yeung, San Francisco Floodplain Administrator, City and County of San Francisco City Administrator's Office, personal communication with Randi Adair, PBS&J, October 16, 2009.



SOURCE: ABAG, 1995.

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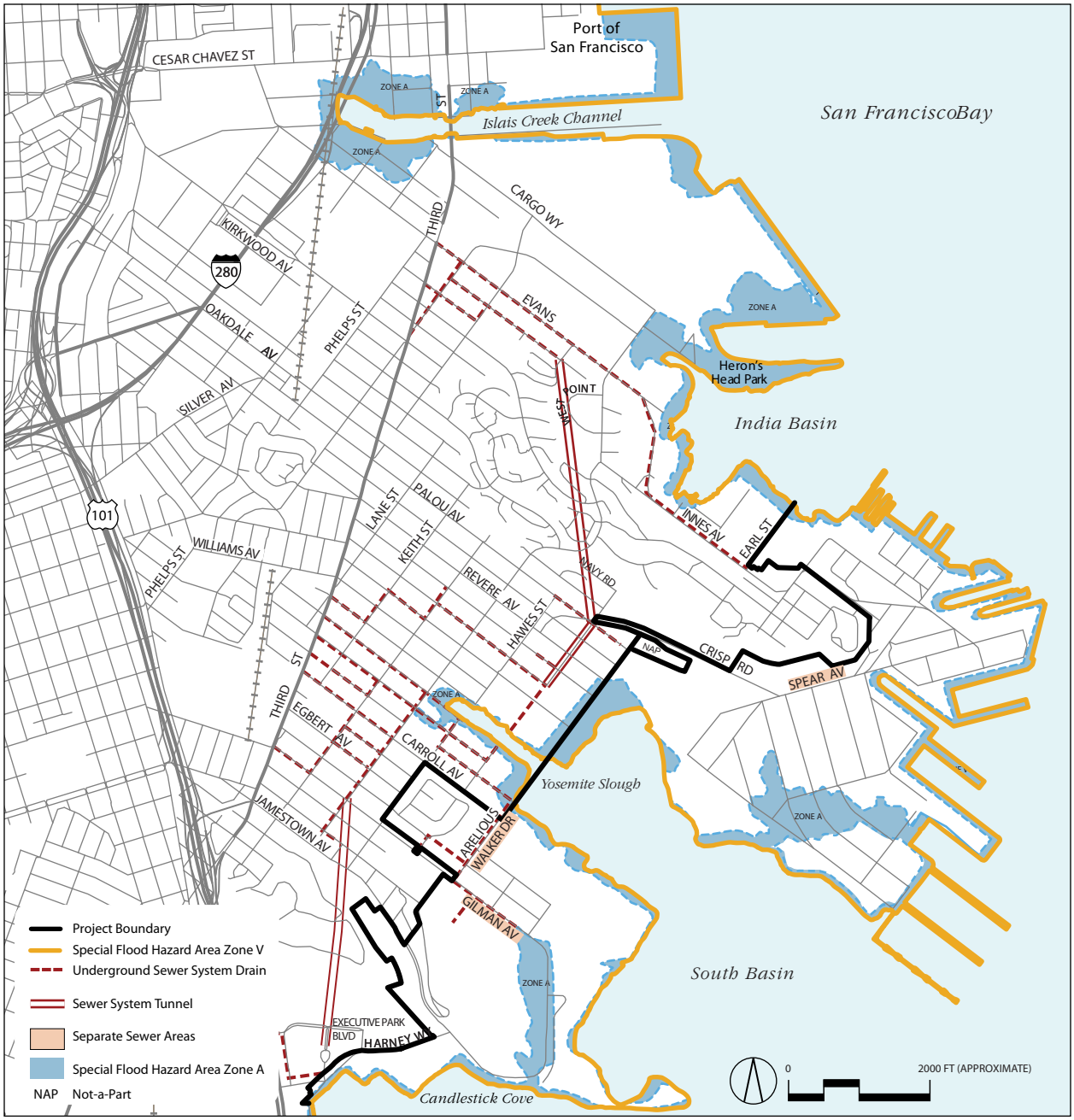
Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.M-3

DAM FAILURE INUNDATION AREAS IN THE PROJECT VICINITY



SOURCE: FEMA firm (Draft).

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.M-4

PRELIMINARY 100-YEAR FLOOD ZONES WITHIN AND ADJACENT TO THE PROJECT

After reviewing comments and appeals related to the preliminary FIRM, FEMA will finalize the FIRMs and publish them for flood insurance and floodplain management purposes. If final FIRMs are published prior to development of the Project, development within designated SFHAs would be subject to applicable FEMA floodplain development regulations (as described in the Regulatory Framework).

Existing Shoreline Conditions

Based on a 2009 shoreline evaluation by Moffatt and Nichol, the shoreline along the Project site consists of armored embankments (riprap of concrete debris, unprotected embankments, bulkheads, pile-supported wharves, and seawalls.[472] There are two low-lying areas along the shoreline at HPS Phase II and Candlestick Point that have been preliminarily mapped by the City Administrator and FEMA as Zone A SFHAs. The shoreline evaluation determined that the shorelines adjacent to these areas need improvement because wave-induced run-up could result in coastal flooding unless the condition or elevation of the existing shoreline protection features along these areas is improved.

Extreme High Tide, Tsunamis, Seiches and Mudflows

Because of the proximity of the Project site to San Francisco Bay, coastal flooding hazards, including tsunamis, seiches, and extreme high tides could occur. The range of tides within the Bay is variable, and the Army Corps of Engineers (USACE) has developed tidal stage (i.e., height) and frequency relationships from long-term tidal measurements to estimate extreme high tide conditions within San Francisco Bay.

The estimated 100-year high tide at the Hunters Point tidal gauge (the closest gauge to both HPS Phase II and Candlestick Point) is +6.7 feet based on the National Geodetic Vertical Datum (NGVD29),[473,474] equivalent to -1.77 feet based on the San Francisco City Datum (SFCD).[475]

In addition to storm-related flooding and extreme high tides, the Project site could potentially be affected by tsunamis. Tsunamis are waves caused by earthquakes that disturb the ocean floor or by large submarine landslides. The potential hazard related to tsunamis in San Francisco Bay has been analyzed in regional studies. The expected 100-year tsunami wave run-up height at South Basin (which is adjacent to both Candlestick Point and HPS Phase II) is +4.8 feet NGVD29 (-3.8 feet SFCD).[476]

A seiche is an oscillation of a body of water. Seiches occur most frequently in enclosed or semi-enclosed basins, such as lakes, bays, or harbors, and may be triggered by strong winds, changes in atmospheric pressure, earthquakes, tsunamis, or tides. Triggering forces that set off a seiche are most effective if they operate at

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[472] Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project Initial Shoreline Assessment*, prepared for Lennar Urban, February, 2009. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[473] Ibid.

[474] NGVD29 is roughly equivalent to mean sea level.

[475] Conversion among mean sea level, NGVD29, and NAVD88 were conducted using the National Oceanic and Atmospheric Administration Vertical Datums Transformation Tool v. 2.2.4, last modified July 13, 2009, website: http://vdatum.noaa.gov/. San Francisco City Datum (SFCD) is a local vertical geodetic reference elevation established by the City Engineer for the City and County of San Francisco. SFCD = NAVD88 + 11.17 feet or NGVD29 + 8.48 feet.

[476] Garcia, A.W. and Houston, J.R., 1975. *Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound*, United States Army Corps of Engineers Technical Report H-75-17. Figure 58. Elevations in the Corps study are referenced to mean sea level and have been converted to NGVD29 and SFCD.

specific frequencies relative to the size of an enclosed basin. Coastal measurements of sea level often show seiches with amplitudes of a few centimeters and periods of a few minutes, caused by oscillations of the local harbor, estuary, or bay, superimposed on the normal tidal changes. Tidal records for San Francisco Bay have been maintained for over 100 years, and during this period, a damaging seiche has not occurred. A seiche of approximately four inches occurred during the 1906 earthquake, an event of magnitude 8.3 on the Richter scale. It is probable an earthquake similar to the 1906 event would be the largest experienced in the Bay Area;[477] consequently a seiche larger than four inches is considered unlikely to occur.

A mudflow is a type of landslide that occurs when runoff saturates the ground. Soil that is dry during dry weather turns into a viscous solution that slides downhill. Mudflows typically cause more damage than clear-water flooding because debris-filled water moves with greater force. Refer to Section III.L (Geology and Soils), Impact GE-6 through Impact GE-8, for a discussion of the potential for landslides to occur at the Project site.

Future Flood Risks

The current potential for coastal flooding will likely be exacerbated in the foreseeable future because of rising sea levels. Globally, sea level has been rising for the past 10,000 years as the result of the end of the last glacial epoch.[478] The global rate of sea level rise had been relatively consistent over the last 5,000 years, at approximately 0.0039 foot/year.[479] However, the current average rate of sea level rise for the San Francisco Bay area is 0.0066 foot/year at the San Francisco tide station.[480] The difference between the rate of sea level rise measured in the Bay Area and the rate of global sea level rise can be accounted for by local changes in ground surface elevation, such as tectonic uplift or subsidence. The rate of relative sea level change is variable even on a local scale.[481]

There is also evidence that sea level rise is accelerating. The cause of the measured acceleration in the rate of sea level rise is primarily attributed to ocean warming (thermal expansion), continental ice melt, and land elevation changes.[482,483,484] The most common explanation for the increased rate of sea level rise is an increase in global

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[477] Working Group On California Earthquake Probabilities, *Earthquake Probabilities in the San Francisco Bay Region: 2002–2031***,** United States Geological Survey Open-File Report 03-214, Appendix D. "Magnitude and Area Data for Strike Slip Earthquakes," Dr. William L. Ellsworth, Research Seismologist, USGS, 2003.
[478] Gornitz, V., January 2007, *Sea Level Rise, After the Ice Melted and Today.* Goddard Institute for Space Studies Science Briefs, website: http;://www.giss.nasa.gov/research/briefs/gornitz_09/, accessed September 18, 2009.
[479] San Francisco Bay Conservation and Development Commission (BCDC), October 1988, op. cit.
[480] National Oceanic and Atmospheric Administration (NOAA), NOAA Tides and Currents. *Mean Sea Level Trend 9414290 San Francisco, California 1887-2006,* website: http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9414290, accessed September 18, 2009.
[481] Moffatt and Nichol, Engineers, December 1988, *Sea Level Rise: Predictions and Implications for San Francisco Bay,* prepared for the San Francisco Bay Conservation and Development Commission, December 1987, revised October 1988.
[482] USEPA, No date. *Coastal Zones and Sea Level Rise*, website: http://www.epa.gov/climatechange/effects/coastal. Accessed September 8, 2009.
[483] Cayan, D., P. Bromirski, K. Hayhoe, M. Tyree, M. Dettinger, and R. Flick. March 2006, White Paper: Projecting Future Sea Level, A Report from: California Climate Change Center CEC-500-2005-202-SF p. 12-13.
[484] US Army Corps of Engineers, July 1, 2009. Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs. Circular No. 1165-2-211, p. B-1 to B-13.

temperatures associated with emission of greenhouse gases.[485] Section III.S (Greenhouse Gas Emissions) contains a discussion of the relationship between greenhouse gas emissions and climate change effects.

State and federal regulatory agencies review a range of possible scenarios when evaluating the potential risks and costs of sea level rise for future development projects. For planning purposes, the USACE evaluates three scenarios of sea level rise; low risk, assuming the current rate of sea level rise, or 19.7 inches (0.5 meter) by 2100; moderate risk, assuming a sea level rise of 39.4 inches (1.0 meter) by 2100; and, high risk, assuming a sea level rise of 59.0 inches (1.5 meters) by 2100.[486] California Executive Order S-13-08 (November 14, 2008) states that all state agencies planning construction projects in areas vulnerable to future sea level rise shall consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability, and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. This Executive Order also directs the California Resources Agency, in cooperation with the Department of Water Resources and the California Energy Commission, to prepare a Sea Level Rise Assessment Report by December 1, 2010 to advise how California should plan for future sea level rise. The Governor of California's Delta Vision Blue Ribbon Task Force has adopted a sea level rise of 55 inches by 2100 for planning purposes, until issuance of an Executive Order determining otherwise.[487] The San Francisco Bay Conservation and Development Commission (BCDC) has prepared maps for areas inundated by 16 inches of sea level rise by 2050 and 55 inches of sea level rise by 2100.[488] Therefore, extrapolating BCDC projections to the 2075 mid-point, sea level rise would be about 36 inches (3 feet), although some studies have concluded this rise would not occur until after the year 2100.[489]

Sea level rise presents an important issue in the planning of development and hazard analysis in coastal areas.[490] Within the Project site, this includes the potential for increased risk of flooding because of higher sea surface levels. A determination or conservative estimate of the potential magnitude of future sea level rise is needed to assess potential impacts related to sea level rise and to identify mitigation measures found to be appropriate to address the impact(s)[491,492] and is provided in the analysis.

Although FEMA has not formally defined the Base Flood Elevations for the Project site, Moffatt and Nichol[493] has evaluated extreme high tide water level elevations for the Project site using NOAA tide gauge data. The Moffatt and Nichol study estimates that development at the Project site constructed at a level less than +6.7

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485 Stanford SOLAR Center, 2008, *Global Warming,* website: http://solar-center.standford.edu/sun-on-earth/glob-warm.html, accessed September 18, 2009.
486 US Army Corps of Engineers, July 1, 2009. Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs. Circular No. 1165-2-211, p. B-1 to B-13.
487 Delta Vision Blue Ribbon Task Force, State of California Resources Agency, March 24, 2008, *Letter to Governor Schwarzenegger,* Agenda Item 2, Attachment 1.
488 San Francisco Bay Conservation and Development Commission (BCDC), April 7, 2009, *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline,* Draft Staff Report.
489 Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project Initial Shoreline Assessment*, prepared for Lennar Urban, February, 2009, op. cit.
490 California Natural Resources Agency, 2009, *2009 California Climate Adaptation Strategy Discussion Draft: A Report to the Governor of the State of California in Response to Executive Order S-13-2008*. p. 4-10.
491 Ibid.
492 Department of the Army, United States Army Corps of Engineers (Corps), July 1, 2009, Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs, Circular No. 1165-2-211. Available at: http://140.194.76.129/publications/eng-circulars/ec1165-2-211/ec1165-2-211.pdf.
493 Moffatt & Nichol, 2009, op. cit.

feet NGVD29 (-1.8 feet SFCD), could be susceptible to flooding associated with the 100-year extreme high tide event. However, as sea level rises, coastal flood hazards associated with storm-related flooding, extreme high tides, and/or tsunamis adjacent to or affecting the Project site would increase. Assuming a 36-inch rise in sea level by 2075, the future base flood (100-year event) elevation would be +9.7 feet NGVD29 (+1.2 feet SFCD).[494] Projected inundation zones for the future Base Flood Elevation, given a 36-inch increase in sea level, are shown in Figure III.M-5 (Flood Zones [Existing and with a 36-Inch Sea Level Rise]). This figure reflects the proposed condition without fill and without shoreline improvements.

Water Quality

Impaired Water Bodies and Total Maximum Daily Loads

The Lower Bay has been identified as an impaired water body by the SWRCB in compliance with *Clean Water Act of 1977* (CWA) Section 303(d), because it does not meet the water quality objectives of the Basin Plan, California Toxics Rule (CTR), or National Toxics Rule (NTR) for listed beneficial uses (industrial service supply; ocean, commercial and sport fishing; shellfish harvesting; estuarine habitat; fish migration; preservation of rare and endangered species; fish spawning; wildlife habitat; water contact recreation; non-contact water recreation; and navigation). The pollutants that have been identified as causing impairment in the Lower Bay are chlordane, dichloro-diphenyl-trichloroethane (DDT), dieldrin, dioxin compounds, exotic species, furan compounds, mercury, and polychlorinated biphenyls (PCBs).[495] Islais Creek, north of the Project site, is listed as an impaired water body because of ammonia, chlordane, dieldrin, hydrogen sulfide, polynuclear aromatic hydrocarbons (PAHs), and sediment toxicity. Candlestick Cove is listed as an impaired water body for indicator bacteria. The potential sources of pollutants identified in the impaired water bodies adjacent to the Project site include non-point sources,[496] CSOs, industrial and municipal point sources,[497] atmospheric deposition, ballast water,[498] resource extraction, natural sources, and unknown sources. A Total Maximum Daily Load (TMDL)[499] for the entire San Francisco Bay has been developed for mercury and has been incorporated by amendment into the Basin Plan. A TMDL for the entire San Francisco Bay has also been developed for PCBs, and its adoption is pending approval by the SWRCB and the USEPA.

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494 Ibid.

495 USEPA, 2007. 2006 CWA Section 303(d) List of Water Quality Limited Segments, June 28, 2007.

496 Non-point sources are diffuse sources of pollutants, generated over a large area, and not discharged at a discrete location, such as runoff from a natural watershed.

497 Point sources are pollutant sources discharged at a discrete location, such as a wastewater treatment plant outfall.

498 Water used to weight a ship to the water's surface, preventing toppling during heavy winds.

499 On a broad level, the TMDL process leads to a "pollution budget" designed to restore the health of a polluted body of water. The TMDL process provides a quantitative assessment of water quality problems, contributing sources of pollution, and the pollutant load reductions or control actions needed to restore and protect the beneficial uses of an individual waterbody impaired from loading of a particular pollutant. More specifically, a TMDL is defined as the sum of the individual waste load allocations for point sources, load allocations for non-point sources, and natural background such that the capacity of the water body to assimilate pollutant loading (the loading capacity) is not exceeded (40 CFR Section 130.2). In other words, a TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards which will ensure the protection of beneficial uses.

SOURCE: RHAA, 2009.

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FIGURE III.M-5

Candlestick Point — Hunters Point Shipyard Phase II EIR

FLOOD ZONE (EXISTING AND WITH A 36-INCH SEA LEVEL RISE)

Regional Monitoring Program

The quality of surface water and groundwater in the vicinity of the Project site is affected by past and current land uses at the site. Water quality within the watershed is also affected by the composition of local geologic materials. In 1993, the San Francisco Estuary Institute initiated the Regional Monitoring Program (RMP) for the San Francisco Bay for the general purposes of assessing regional water quality conditions and characterizing patterns and trends of contaminant concentrations and distribution in water and sediment, as well as identifying general sources of contamination to the Bay. The program has established a database of water quality and sediment quality in the estuary, particularly with regard to toxic and potentially toxic trace elements and organic contaminants. However, there are no water quality RMP monitoring stations (fixed locations or random sites) in close proximity to the Project site;[500] therefore, the trends identified by this monitoring program reflect regional, rather than site-specific, water quality conditions. Based on monitoring results from the RMP for 2002 to 2006, water column samples collected from the Lower Bay did not contain contaminant concentrations above regulatory thresholds as listed in Table III.M-1 (Lower Bay Regulatory Thresholds).[501] A TMDL is in effect for mercury for the entire San Francisco Bay.

Table III.M-1 Lower Bay Regulatory Thresholds

Compound	*Units*[a]	*4-day Average*	*1-hour Average*	*24-hour Average*
Dissolved Arsenic	µg/L	36	69	NA
Dissolved Cadmium	mg/L	9.3	42	NA
Dissolved Chromium VI	mg/L	50	1,100	NA
Dissolved Copper[b]	µg/L	3.1	4.8	NA
Dissolved Lead	µg/L	8.1	210	NA
Total Mercury	µg/L	0.025	2.1	NA
Dissolved Nickel	µg/L	8.2	74	NA
Dissolved Silver	µg/L	NA	1.9	NA
Total Selenium	µg/L	5.0	20	NA
Dissolved Zinc	µg/L	81	90	NA
Polynuclear Aromatic Hydrocarbons	µg/L	NA	NA	15
Chlordane[d]	µg/L	0.004	0.09	NA
Chlorpyrifos[d]	µg/L	0.0056	0.011	NA
Dieldrin	µg/L	0.0019	0.71	NA
Endrin[d]	µg/L	0.0023	0.037	NA
Gamma-HCH[d]	µg/L	NA	0.16	NA
Heptachlor[d]	µg/L	0.0036	0.053	NA
Heptachlor Epoxide[d]	µg/L	0.0036	0.053	NA
p,p'-DDT[d]	µg/L	0.001	0.13	NA
Mirex[d]	µg/L	0.001	NA	NA

[500] There are, however, sediment quality sampling sites located near the Project site, as described below, under 'Sediment Quality'.
[501] San Francisco Estuary Institute (SFEI), *The 2006 RMP Annual Monitoring Results*, 2007. San Francisco Estuary and the Regional Monitoring Program for Water Quality in the San Francisco Estuary. SFEI Contribution No. 542, p. 43.

Table III.M-1 Lower Bay Regulatory Thresholds

Others	*Units*	*Value*	*Description*
Dissolved Oxygen	mg/L	5.0	Minimum
pH	SU	6.5-8.5	No change greater than 0.5 SU from natural conditions by controllable factors
Temperature	Degrees Fahrenheit	5°F increase	No increase greater than 5°F from natural conditions by controllable factors
Turbidity	NTU	10 percent increase	No increase greater than 10 percent from natural conditions by controllable factors where natural turbidity is greater than 50 NTU
Unionized ammonia	mg/L	0.025 (median) 0.40 (maximum)	Lower Bay
Fecal coliforms	MPN/100 mL	<14 (geometric mean) <43 (90th percentile)	Most limiting use; shellfish harvesting
Toxicity (acute)[c]	Test Organism Survival Rate	> 90 percent (median) > 70 percent (90th percentile)	96 hour static or continuous flow tests
Toxicity (chronic) [c]		NA	No chronic toxicity allowed

SOURCE: California Regional Water Quality Control Board San Francisco Bay Region, *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan), January 18, 2007.

NA = not applicable

a. Where mg/L = milligrams per liter (parts per thousand), mg/L = micrograms per liter (parts per million), mL = milliliters, SU = standard units, NTU = Nephelometric Turbidity Units, MPN = Most Probable Number, geometric mean = logarithmic average of at least 5 samples per month.

b. USEPA may update these values without requiring a Basin Plan amendment. Source of current limit: Central Valley Regional Water Quality Control Board, 2008, Water Quality Limits for Constituents and Parameters, A Compilation of Water Quality Goals July 2008 Edition, Available at: http://www.swrcb.ca.gov/water_issues/programs/water_quality_goals/index.shtml

c. Acute refers to sudden, episodic conditions; chronic refers to long term conditions

d. Source: San Francisco Estuary Institute (SFEI), 2007, The 2006 RMP Annual Monitoring Results. San Francisco Estuary and the Regional Monitoring Program for Water Quality in the San Francisco Estuary. SFEI Contribution No. 542. San Francisco Estuary Institute, Oakland, CA, p. 49

Occurrence of CSO Events

In accordance with the Long-Term Control Plan required under the City's NPDES Wastewater Discharge Permit (see Regulatory Framework, below) SFPUC designed its combined sewer system based on historical rainfall to achieve the long-term average goal of only one CSO event per year along the southeast sector of the City. This wet weather performance criteria (no more than one CSO per year) is a long-term average and is not to be used to determine compliance or non-compliance with the wastewater operations NPDES permit/WDR because some years are wetter than others and may contribute more flow to the treatment system than anticipated and designed.[502] However, the SFPUC is also required to optimize the operation of its system to minimize overflows and maximize pollutant removal. No CSO events are untreated because all discharges receive at least primary treatment in the storage and transport system.[503]

[502] The California Regional Water Quality Control Board, San Francisco Bay Region recognizes that some years are wetter than others and may contribute more flow than anticipated in the system design criteria.

[503] California Regional Water Quality Control Board, San Francisco Bay Region. 2008, Order No. R2-2008-0007 and NPDES No. CA0037664, Waste Discharge Requirements for the City and County of San Francisco Southeast Water Pollution Control Plant, North Point Wet Weather Facility, and Bayside Wet Weather Facilities and Wastewater Collection System, adopted January 30, 2008.

The principal pollutants in CSOs are pathogens, oxygen depleting substances, TSS, toxics (metals, petroleum hydrocarbons, man-made organic chemicals), nutrients, and floatables. CSOs can adversely affect some beneficial uses of the Lower Bay such as aquatic life support, fish consumption, shellfish harvesting, and recreation. On the 303(d) list, CSOs are listed as a source of pollutants causing impairment in Islais Creek. Wet weather beach water quality data collected by the SFPUC and San Francisco Department of Public Health (DPH) in the vicinity of the Project, which includes the effects of CSOs, discharges from separate storm drain systems, and runoff discharging directly into the Bay, indicate levels above those presented in the Basin Plan water quality objective for total coliform bacteria. Also, the other pathogen indicators that are monitored have significantly higher concentrations in wet weather than in dry weather.

Beach Water Quality

The SFPUC and the DPH collaboratively implement a shoreline beach water quality monitoring program. The monitoring program consists of year-round weekly sampling at 14 locations around the perimeter of San Francisco where water contact recreation may occur (including three stations near the Project site). Additional monitoring is conducted whenever CSO events occur that could affect a monitored beach. Samples are analyzed at the SFPUC Microbiology Laboratory for pathogen indicator bacteria[504] that include total coliform, Escherichia coli, and enterococcus bacteria.

Adjacent to the Project site are the sampling locations at Jack Rabbit Beach, Windsurfer Circle, and Sunnydale Cove. The Windsurfer Circle and Sunnydale Cove sampling locations are nearest to CSO 043 (Candlestick Cove) and the Jack Rabbit Beach sampling location is south of CSO 042 (South Basin), as shown on Figure III.M-1 and Figure III.M-2.

Water quality in the vicinity of the three beach water quality locations is affected by both separate sewer system discharges and combined sewer discharges. Jack Rabbit Beach has the lowest pathogen indicator concentrations for both wet- and dry-weather conditions, and Windsurfer Circle has the highest concentrations. Pathogen indicator concentrations are significantly higher in wet-weather than in dry-weather for all stations. Twenty wet-weather samples exceeded the Basin Plan single sample objective for total coliforms (10,000 Most Probable Number [MPN] per 100 milliliters) at Sunnydale Cove; 40 wet-weather samples exceeded this objective at Windsurfer Circle; and, no wet-weather samples exceeded this objective at Jack Rabbit Beach. Thirteen dry weather samples exceeded the single sample objective for total coliforms at Windsurfer Circle; two dry weather samples exceeded this objective at Jack Rabbit Beach; and, no dry weather samples exceeded this objective at Sunnydale Cove. The data summary for the three locations in the vicinity of the Project site is provided in Appendix M2 (Water Quality Data Analysis). Because the beach water quality samples were collected within the Bay, the data do not indicate any violations of wastewater discharge permit conditions (the wastewater discharge permit regulates the discharge of treated combined sewer flows into the Bay).

Stormwater Discharge Quality

As runoff water flows over the landscape, it picks up dissolved chemicals, particulate material, and gross debris from the surface it flows over, prior to discharge into a water body. The effects of this runoff water

[504] Although they are not generally harmful themselves, pathogen indicators indicate the possible presence of disease-causing bacteria, viruses, and protozoa.

on surface water quality depend upon the amount and type of material being picked up and transported, as well as the amount of water or flow rate in the receiving water. Constituents and concentrations within runoff water vary according to land cover, land use, topography, and the amount of impervious cover, as well as the intensity and frequency of irrigation or rainfall. Runoff from undeveloped areas will reflect the natural chemistry and ecology of the watershed. Runoff in developed areas may typically contain oil, grease, and metals accumulated in streets, driveways, parking lots, and rooftops, as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-demanding substances from landscaped areas. Runoff from open space areas and parks may typically contain nutrients, pesticides, organic debris, bacteria, sediment, and others.

Candlestick Point

Site-specific data on stormwater runoff quality from Candlestick Point are not available. However, stormwater runoff quality is highly dependent on the natural and human-influenced nature of the drainage area. As such, stormwater runoff from urban land uses, like the current land uses at Candlestick Point, would likely contain pathogens, metals, nutrients, sediment, trash and debris, oxygen-demanding substances, various organic chemicals, pesticides, PCBs, and mercury.

Hunters Point Shipyard Phase II

The stormwater runoff from HPS Phase II is currently permitted under the General NPDES Permit for Stormwater Discharges Associated with Industrial Activities (Industrial General Permit) (Water Quality Order 97-03-DWQ; General Permit No. CAS000001). Water quality monitoring is performed according to terms specified in the Industrial General Permit (see Regulatory Framework), which requires sampling of stormwater runoff from all outfalls that produce a discharge and analysis of basic indicator parameters. By comparing USEPA stormwater quality benchmarks[505] to the stormwater monitoring data from the HPS Phase II site, the extent to which stormwater pollutant concentrations are elevated above those benchmarks can be identified. Indicator parameters exceeding the benchmarks do not necessarily constitute a violation of water quality standards or an exceedance of permit conditions. Parameter benchmarks are designed to indicate a potential problem and to measure if existing BMPs are effective.

[505] The Draft Final 2005 Industrial General Permit contains parameter benchmark concentrations for certain constituents that are derived from USEPA's Multi-Sector General Permit (MSGP). The benchmarks will take effect when the Draft Final Permit is adopted. The benchmarks are not numeric discharge limits, but are used to assess if site Best Management Practices (BMPs) are effective for reducing concentrations of pollutants of concern. The Draft Permit requires that if runoff concentrations are above one or more benchmarks, the discharger must revise its Storm Water Pollution Prevention Plan (SWPPP) to include more effective BMPs, and collect samples from the next two consecutive qualifying storms.

Six annual reports for stormwater discharges at HPS Phase II representing the 2002/03 through 2007/08 reporting periods were available at the SFRWQCB for review.[506,507,508,509,510,511] With the exception of the Annual Report for the 2007-2008 reporting period, separate reports were prepared for the inactive industrial landfill and the remainder of HPS Phase II. Landfill monitoring data were available in Annual Reports for the 2004/05, 2006/07, and 2007/08 reporting periods. Summaries of the data contained in these reports are included in Appendix M2. The basic indicator parameters are as follows:

pH. pH is a numeric measurement of the hydrogen-ion concentration in water. The neutral range is usually considered to be within 6.5 to 8.5. At values less than 6.5, the water is considered acidic; above 8.5 it is considered alkaline or basic. Pure rainfall tends to have a pH of a little less than 7. Many industrial facilities handle materials that can affect pH. pH is not listed on the 303(d) list as impairing water quality in the Lower Bay.

Specific Conductance (SC). SC is a numerical expression of the ability of water to carry an electric current. It provides an indication of the degree of mineralization, salinity, or the total dissolved solids present (TDS) in stormwater discharges. Rainwater has a SC of close to zero and seawater has a very high SC. High SC could affect the usability of waters for drinking, irrigation, and other commercial or industrial use. SC is not listed on the 303(d) list as impairing water quality in the Lower Bay.

Total Suspended Solids (TSS). TSS is an indicator of the undissolved solids in stormwater runoff. Sources of TSS include sediment from erosion and dirt from impervious areas, as well as other particulates. Because many pollutants can adhere to sediment particles, reducing sediment can reduce the amount of these pollutants in stormwater discharges. TSS is not listed on the 303(d) list as impairing water quality in the Lower Bay.

Total Organic Carbon (TOC). TOC is an indicator of the total organic matter present in water. Organic matter can be natural (such as from plants and animals) or man-made (synthetic organics such as fuels and pesticides). Natural organic matter can deplete the receiving waters of oxygen as it biodegrades. Synthetic organics, even when discharged at low concentrations, can be harmful to and, in some cases, bioaccumulate in aquatic life. TOC is not listed on the 303(d) list as impairing water quality in the Lower Bay.

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[506] Department of the Navy Base Realignment and Closure Program Management Office West, 2002/2003 *Annual Report for Storm Water Discharges Associated with Industrial Activities at Hunters Point Shipyard, San Francisco, California*, No date.
[507] Department of the Navy Base Realignment and Closure Program Management Office West, 2004-2005 *Annual Report for Storm Water Discharge Management IR-01/21, Industrial Landfill, Parcel E-2, Hunters Point Shipyard, San Francisco, California*, June 30, 2005. Prepared by AFA Construction Group/EEC.
[508] Department of the Navy Base Realignment and Closure Program Management Office West, *2005-2006 Storm Water Monitoring Report, Hunters Point Shipyard, San Francisco, California*, June 2006.
[509] Department of the Navy Base Realignment and Closure Program Management Office West*, 2006/2007 Storm Water Monitoring Report, Hunters Point Shipyard, San Francisco, California*, 2007.
[510] Department of the Navy Base Realignment and Closure Program Management Office West, *2004-2005 Annual Report for Storm Water Discharge Management IR-01/21, Industrial Landfill, Parcel E-2, Hunters Point Shipyard, San Francisco, California*, July 31, 2007. Prepared by AFA Construction Group/EEC.
[511] Department of the Navy Base Realignment and Closure Program Management Office West, *2007/2008 Annual Report for Storm Water Discharges Associated with Industrial Activities, Hunters Point Shipyard, San Francisco, California*, June 2008. Prepared by Marrs Services, Inc. and MACTEC Engineering & Consulting, Inc.

Oil and Grease (O&G). At very low concentrations, O&G can cause sheen on the surface of water. O&G can adversely affect aquatic life, create unsightly floating material, and make water undrinkable. Sources of O&G at industrial facilities include maintenance shops, vehicles, machines, and roads. O&G is not listed on the 303(d) list as impairing water quality in the Lower Bay.

Metals. Emissions from automobiles and many artificial surfaces of the urban environment (e.g., those covered with galvanized metal, paint, or preserved wood), contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Metals are often associated with sediments in stormwater. Metals are of concern because they are toxic to aquatic organisms and can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish, which can be a health hazard if consumed by other aquatic organisms or people). Metals are listed on the 303(d) list as impairing the water quality of the Lower Bay. Mercury in particular is a pollutant of concern in the Lower Bay and is the focus of a TMDL. Sources of mercury in urban runoff include mercury-containing instruments, switches and thermostats, and fluorescent lighting.[512]

In addition to the basic indicator parameters described above, certain industrial facilities, as determined by the facility's Standard Industrial Classification (SIC), must analyze stormwater runoff samples for additional parameters. HPS Phase II contains many parcels that are leased to other entities; therefore, the additional parameters monitored at each outfall depend on the SIC(s) of the facilities discharging to the outfall. The additional parameters generally include heavy metals, such as copper and zinc. In addition, runoff from the industrial landfill portion of HPS Phase II is monitored for additional parameters that could potentially be present at the landfill, in accordance with the facility's Storm Water Discharge Management Plan; additional constituents analyzed in runoff from the industrial landfill include semi-volatile organic compounds, PCBs, and metals.

At each outfall, there was at least one parameter whose mean concentration exceeded the benchmark. Parameter benchmarks were exceeded for conductivity, total suspended solids (TSS), total copper, total zinc, and total lead; benchmarks for conductivity and TSS were exceeded most frequently.

Sediment Quality

Regional sediment sampling is being conducted by the San Francisco Estuary Institute as part of the RMP. The sampling occurs throughout the Bay, and a few samples have been taken near the Project site. Elevated levels of methylmercury, PCBs, and PAHs were identified in nearshore sediments samples taken near the Project site.[513] The SFRWQCB also conducted and/or reviewed sediment quality data as part of the Bay Protection and Toxic Cleanup Plan for sites throughout the Bay.[514] Lower Islais Creek was listed as a toxic

[512] L. Mckee and P. Mangarella, San Francisco Estuary Institute (SFEI) Poster: Mercury budget for stormwater conveyances in the San Francisco Bay Area: Towards achieving TMDL management goals for sediment and fish tissues, SFEI website:
http://www.sfei.org/presentations_posters/MERCURYCONF_06/Mercury06_poster_mcKee_final.pdf, Accessed July 18, 2009.
[513] San Francisco Estuary Institute (SFEI), 2007, *The Pulse of the Estuary: Monitoring and Managing Water Quality in the San Francisco Estuary. SFEI Contribution 532.* San Francisco Estuary Institute, Oakland, CA, pp. 34, 39, 42.
[514] State Water Resources Control Board (SWRCB), *Consolidated Toxic Hot Spots Cleanup Plan*, June 1999.

hot spot[515] because of sediment contamination and impacts to aquatic life; the constituents of concern included PCBs, chlordane, dieldrin, endosulfan, hydrogen sulfide, ammonia, and PAHs. The SFRWQCB indicates the most likely source of pollutants is stormwater entering the channel directly or through the CSOs. Another possible source is the SWPCP outfall at Quint Street. However, because of recent improvements in the treatment of discharges from the CSOs and the Quint Street outfall, historic discharges from these sources may have had a more significant impact than current discharges.[516]

In 2004, the SFPUC prepared a study to evaluate ecological risk from sediment quality around Yosemite Slough.[517] Sampling occurred between 1998 and 2001, and 32 samples were collected in the slough. Samples were taken up to a depth of four feet below ground surface (bgs). Chemical analyses included heavy metals, PCBs, PAHs, and chlorinated pesticides. Sample data were compared to data from six reference sites in the Bay, as well as Effects Range-Medians (ERMs).[518]

Mercury and nickel in surface samples exceeded SFPUC reference site concentrations and ERMs; however, even the SFPUC reference sites exceeded the nickel ERM.[519] Most other heavy metal concentrations were elevated compared to reference site concentrations, but did not exceed ERMs. Subsurface metals concentrations generally decreased with depth, and generally concentrations below two feet were consistent with SFPUC reference site surface sediment concentrations.

No surface sediment samples collected from Yosemite Slough exceeded the PAH ERM, and only one subsurface sample exceeded the PAH ERM. Most surface samples for PCBs exceeded the ERM, and all samples were at least an order of magnitude higher than the mean SFPUC reference site concentration. For subsurface samples, generally the highest concentrations were in the surface to one-foot deep (one foot bgs) core samples, and PCB ERMs were exceeded in almost all cases.

Many chlorinated pesticides were not detected above the analytical practical quantification limit.[520] Total chlordane, DDT, and dieldrin were detected most frequently in samples. All concentrations were elevated compared to the SFPUC reference site mean concentrations, and most mean concentrations exceeded ERMs.[521] Therefore, these data indicate that sediments in Yosemite Slough have been adversely impacted by historic land uses, and sediment quality (for mercury and organic chemicals) could impair the beneficial uses of the Bay.

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[515] According to SFEI, toxic hot spots can be defined as: "Locations in enclosed bays, estuaries, or the ocean where pollutants have accumulated in the water or sediment to levels which (1) may pose a hazard to aquatic life, wildlife, fisheries, or human health, (2) may impact beneficial uses, or (3) exceed State Water Resources Control Board or Regional Water Quality Control Board-adopted water quality or sediment quality objectives." SFEI, 2009, *Glossary of Terms*, website: http://www.sfei.org/rmp/rmp_glossary.html#top (accessed September 30, 2009).

[516] State Water Resources Control Board (SWRCB), *Consolidated Toxic Hot Spots Cleanup Plan*, June 1999.

[517] San Francisco Public Utilities Commission (SFPUC), Draft Final Sediment Investigation at Yosemite Creek, October 1998-May 2000, July, 2004.

[518] The Effects Range Median (ERM) is the concentration above which effects are frequently or always observed among most species of biota.

[519] San Francisco Public Utilities Commission (SFPUC), Draft Final Sediment Investigation at Yosemite Creek, October 1998-May 2000, July, 2004.

[520] The lowest level of certainty that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

[521] San Francisco Public Utilities Commission (SFPUC), Draft Final Sediment Investigation at Yosemite Creek, October 1998-May 2000, July, 2004.

As noted in Section III.K, a shoreline investigation of sediment contamination was conducted for the 440 acres of underwater land surrounding all portions of the HPS Phase II site to the north, east, south, and southwest. This investigation evaluated whether contamination in Parcels E and E-2 had the potential to migrate (or had migrated) to sediments in the adjacent offshore area or to affect benthic invertebrates, birds, and mammals in the shoreline area. Copper, mercury, and PCBs were identified as the primary risk drivers. These chemicals exceeded concentrations considered safe for benthic invertebrates directly exposed to sediment. PCBs also were shown to cause potential risk to humans if they were to consume shellfish collected at HPS Phase II. However, results of statistical comparisons of fish tissue data at HPS Phase II indicated the potential PCBs risk at HPS Phase II was similar to regional levels.[522] The report concluded that no unacceptable ecological risk was indicated by sediments in India Basin or the wetlands east of the Slough.

Groundwater Quality

Portions of the Islais Valley, Visitacion Valley, and South San Francisco groundwater basins underlie the Project site. Existing designated beneficial uses are industrial service and process supplies.[523] Potential beneficial uses of these groundwater basins include municipal and domestic supplies (drinking water) and agricultural supplies; however, the underlying groundwater is not suitable as a drinking water supply.[524]

Principal contaminants in groundwater come from both nonpoint and point sources and include nitrates, pesticides, and industrial chemicals such as solvents.[525] Most groundwater contamination is local in scale.[526] The majority of groundwater pollutants from nonpoint sources[527] are salts and nitrates, which adversely affect approximately 10 to 15 percent of California's water wells, followed by pesticides and industrial contaminants.[528] Pathogens can also migrate to groundwater and contaminate groundwater resources.[529] These contaminants, often associated with septic systems and animal wastes, are transported by water percolating from the soil to the water table, where they enter the groundwater.[530]

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[522] Health concerns associated with fish consumption in San Francisco Bay is a regional issue. Concentrations of six chemicals or groups—including mercury, PCBs, dioxins, dieldrin, DDT, and chlordane in fish collected throughout the San Francisco Bay—are elevated enough to pose a potential risk to recreational anglers and have resulted in health advisory warnings.
Barajas and Associates, *Final Feasibility Study Report for Parcel F Hunters Point Shipyard,* April 30. 2008; Jonas and Associates, *Final Second Five-Year Review of Remedial Actions Hunters Point Shipyard*, November 11, 2008. These documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[523] Basin Plan, 2007.
[524] Basin Plan, 2007.
[525] Harter, T., 2003, Reference: Groundwater Quality and Groundwater Pollution, University of California Division of Agriculture and Natural Resources Publication 8084.
[526] Harter, T., 2003, Reference: Groundwater Quality and Groundwater Pollution, University of California Division of Agriculture and Natural Resources Publication 8084.
[527] Nonpoint sources of pollution are diffuse sources, dispersed over a large area and not conveyed in a pipe or other conveyance structure or discharged at a discrete location.
[528] Harter, T., 2003, Reference: Groundwater Quality and Groundwater Pollution, University of California Division of Agriculture and Natural Resources Publication 8084.
[529] Ibid.
[530] Ibid.

The degree of groundwater pollution from point and nonpoint sources depends on a number of factors:[531]

- **Point Sources (PSs)**—The number and intensity of point sources discharge directly to groundwater or to land surfaces.
- **Nonpoint sources (NPSs)**—The number and intensity or strength of NPS pollution activities within the source area of a well or a spring. A large number of low-grade NPS pollution sources may have a cumulative effect similar to that of a few more-intense NPS pollution sources.
- **Percolation rate**—The rate of percolation from the land surface to groundwater. A significant amount of chemicals or pathogens may reach groundwater when the water percolation rate is high.
- **Natural attenuation**—The ability of the soil or aquifer to retain or degrade the chemical before it reaches a well, spring, stream, or lake. The more a chemical is degraded or retained in the subsurface, the less likely it will be to reach a nearby well or stream. This is also a function of the pollutant; certain pollutants are more likely to be retained or degraded compared to others that are readily transported to or within groundwater.

Groundwater beneath the Project site flows from the west towards the Lower Bay.[532] As it passes beneath the Project site, it may become contaminated with bacteria and nutrients from leaky sewers, septic tanks, lawn fertilizers, pet waste, and other sources.[533] Historic land uses within the Project site may have resulted in the contamination of soil or groundwater with hazardous materials, as noted in Section III.K. Finally, groundwater near the shoreline may also mix with saltwater that ebbs and flows into coastal waters with the pull of the tides.[534] Local anomalies in groundwater elevation can also be caused by the interaction of subsurface utilities (sanitary sewer, storm sewer, and water supply lines) with the regional groundwater regime.[535] Storm/sanitary sewer lines and backfill in the utility trenches can serve as preferential pathways for groundwater flow and can either discharge or receive water.[536] Local anomalies in groundwater elevation have also been caused by groundwater injection/extraction activities associated with treatability studies.[537,538]

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[531] Ibid.
[532] CE2-Kleinfelder Joint Venture, 2009, Semiannual Groundwater Monitoring Report (April-September 2008) Hunters Point Shipyard San Francisco, California, February 2009. P. 2-3. Prepared for Department of the Navy Base Realignment and Closure Program Management Office West, February 2009.
[533] Johnson, C.S., February 6, 2006. In Search of the Source of Beach Pollution, Scientists Monitor Groundwater: New Sea Grant Study to Look at Beaches in Santa Cruz and Bolinas, NOAA Research Archive of Spotlight Features. http://www.oar.noaa.gov/spotlite/archive/spot_beachpollution.html (accessed September 20, 2009).
[534] Johnson, C.S., February 6, 2006. In Search of the Source of Beach Pollution, Scientists Monitor Groundwater: New Sea Grant Study to Look at Beaches in Santa Cruz and Bolinas, NOAA Research Archive of Spotlight Features. http://www.oar.noaa.gov/spotlite/archive/spot_beachpollution.html Accessed September 20, 2009.
[535] CE2-Kleinfelder Joint Venture, 2009, Semiannual Groundwater Monitoring Report (April-September 2008) Hunters Point Shipyard San Francisco, California, February 2009. P. 2-4. Prepared for Department of the Navy Base Realignment and Closure Program Management Office West, February 2009.
[536] Ibid.
[537] Ibid.
[538] Treatability studies are pilot-scale type tests conducted at hazardous wastes sites to determine if a treatment technology will work for that site's particular set of environmental conditions. Such studies have been conducted at HPS Phase II to address the sources of contamination described in Section K, Hazards and Hazardous Materials.

DWR has limited information on the water quality of the groundwater basins underlying the Project site, but indicates that elevated nitrate concentrations are the most common water quality problem with wells in the San Francisco Peninsula. High chloride concentrations were also observed in some wells.[539]

Within the boundaries of the Project site, there are numerous locations where the underlying groundwater has been affected by releases of various inorganic and organic constituents associated with current and previous land uses, as noted in Section III.K. Figure III.M-6 (Existing Groundwater Contamination) depicts the locations of groundwater contamination at the Project site as well as inferred depth to groundwater. Groundwater remediation within these areas is at various stages of completion.

Only low levels of a few organic compounds have been detected in groundwater beneath Candlestick Point. However, the portions of Candlestick Point bayward of the high tide elevation are covered with fill material that may contain hydrocarbons, heavy metals, oil and grease, and semi-volatile organic compounds (SVOCs).

The primary contaminants found in groundwater associated with HPS Phase II include volatile organic compounds (VOCs), SVOCs, total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), pesticides, cyanide, metals, and radionuclides.[540] VOCs and certain metals have exceeded water quality criteria in groundwater at HPS Phase II. The landfill on HPS Phase II also contains radium dials that could contribute to groundwater contamination.[541] Potential threats may also be presented by off-gas from VOCs, particularly vinyl chloride, present in hot spots in soil and groundwater. [542] The Navy's Radiological Defense Laboratory program operated at HPS Phase II from the 1940s to 1969, and various radionuclides, primarily radium 226 and cesium 137, have also been found in the groundwater.[543]

Refer to Section III.K for further discussion of groundwater quality conditions related to hazardous materials contamination and remediation activities.

III.M.3 Regulatory Framework

Federal

Clean Water Act

The *Clean Water Act of 1977* (CWA) (33 US Code [USC] Section 1251 et seq.), which amended the federal *Water Pollution Control Act of 1972*, established the basic structure for regulating discharges of pollutants into waters of the United States (not including groundwater) and waters of the State of California. Waters of the United States (defined in 40 CFR 230.3(s)) include water bodies that are used in interstate or foreign

[539] California Department of Water Resources (DWR), 2003, op. cit.
[540] CE2-Kleinfelder Joint Venture, 2009, Semiannual Groundwater Monitoring Report (April-September 2008) Hunters Point Shipyard San Francisco, California, February 2009. P. 2-2. Prepared for Department of the Navy Base Realignment and Closure Program Management Office West, February 2009.
[541] USEPA, July 29th 2009, Region 9: Superfund Hunters Point Naval Shipyard EPA#:CA1170090087. http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/vwsoalphabetic/Hunters+Point+Naval+Shipyard?OpenDocument#threats (accessed September 23, 2009).
[542] Ibid.
[543] Ibid.

SOURCE: ARUP, 2009.

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FIGURE III.M-6

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING GROUNDWATER CONTAMINATION

commerce, waters which are subject to the ebb and flow of the tide, interstate waters, tributaries of such waters, and wetlands adjacent to such waters. Waters of the State are defined by the SWRCB as any surface water or groundwater, including saline waters, within the boundaries of the State. Examples include, but are not limited to, rivers, streams, lakes, bays, marshes, mudflats, unvegetated seasonally ponded areas, drainage swales, sloughs, wet meadows, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands. Impacts to waters of the United States and impacts to waters of the State can differ because of the differing laws and regulations that address these impacts. As interpreted by the regional USEPA and SWRCB, CWA permits and other regulatory mechanisms may refer to only one of the two categories. For example, CWA Section 401 Water Quality Certifications apply to waters of the State, while NPDES permits apply to waters of the United States.

The CWA delegates authority to the USEPA to implement pollution control programs. Under the CWA, it is unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a NPDES permit is obtained. In addition, the CWA requires each state to adopt water quality standards for receiving water bodies and to have those standards approved by the USEPA. Water quality standards consist of designated beneficial uses for a particular receiving water body (e.g. wildlife habitat, agricultural supply, fishing etc.), along with water quality objectives necessary to support those uses.

CWA Section 303 Water Quality Standards

Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface waters of the United States based on the water body's designated beneficial use. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric, although narrative criteria based upon biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards. Water quality standards applicable to the Project are listed in the San Francisco Bay Basin Water Quality Control Plan Basin (Basin Plan) and are described in the Impacts discussion below.

CWA Section 303 Impaired Water Bodies and Total Maximum Daily Loads

Under CWA Section 303(d) of the CWA, the SWRCB is required to develop a list of impaired water bodies that do not meet water quality standards (promulgated under the National Toxics Rule or California Toxics Rule) after the minimum technology-based effluent limitations and water quality-based effluent limitations have been implemented for non-stormwater runoff permitted point sources. Lists are to be priority ranked for development of a total maximum daily load (TMDL). A TMDL is a calculation of the total maximum daily load (or "amount") of a pollutant that a water body can receive on a daily basis and still safely meet water quality standards. The SWRCB, Regional Water Quality Control Boards (RWQCB) and USEPA are responsible for establishing TMDL waste load allocations and incorporating approved TMDLs into water quality control plans, NPDES permits, and WDRs in accordance with a specified schedule for completion.

A mercury TMDL for San Francisco Bay has been completed, and on February 12, 2008, the USEPA approved a Basin Plan amendment incorporating the mercury TMDL into the Basin Plan.[544] A PCB TMDL

[544] San Francisco Bay Regional Water Quality Control Board (Water Board), website: http://www.swrcb.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/sfbaymercurytmdl.shtml, accessed November 20, 2008.

has also been developed for San Francisco Bay and the SFRWQCB adopted a Basin Plan amendment on February 13, 2008, which is still pending final approval from the SWRCB and USEPA. A selenium TMDL is being developed for the North Bay (from the Sacramento-San Joaquin Delta to the central Bay), which is not in the vicinity of the Project site.

The mercury and PCB TMDLs include numeric targets for concentrations in suspended sediment and/or fish tissue. The TMDLs also include waste load allocations[545] for urban stormwater runoff and municipal and industrial wastewater discharges, with allocations apportioned for individual municipal separate storm sewer systems (MS4s)[546] and wastewater treatment plants including those in San Francisco. For stormwater, load reductions would be required to meet the TMDL waste load allocations within the 20 years required by the TMDLs. Load reduction efforts for TMDLs are implemented through municipal NPDES stormwater permits and individual NPDES permits (e.g., NPDES permit for water treatment plant discharges and others).

CWA Section 401 Water Quality Certification

Section 401 of the CWA specifies that states must certify that any activity subject to a permit issued by a federal agency, such as the USACE, meets all state water quality standards. In California, the SWRCB and the nine RWQCBs are responsible for taking certification actions for activities subject to any permit issued by the Corps pursuant to Section 404 (or for any other Corps' permit, such as permits issued pursuant to Section 10 of the *Rivers and Harbors Act of 1899*). Such certification actions, also known as 401 certification or water quality certification, include issuing a 401 certification that the activity subject to the federal permit complies with state water quality standards, issuing a 401 certification with conditions, denying 401 certification, or denying 401 certification without prejudice, should procedural matters preclude taking timely action on a 401 certification application. If 401 certification is denied, the permit pertaining to the proposed federal action is denied as well.

In practice, most RWQCBs rely on applications for Section 401 certification to evaluate whether WDRs would also need to also be issued for a project. The RWQCB must review final CEQA documentation prior to taking an action on an application for water quality certification and/or WDRs.

CWA Section 402 Stormwater NPDES Permits

Section 402(p) of the CWA regulates point source discharges of pollutants under the NPDES program. This section of the CWA was amended in 1987 to require the USEPA to establish regulations for permitting of municipal and industrial stormwater discharges (including discharges from active construction sites) under the NPDES permit program. The USEPA published final regulations for industrial and municipal stormwater discharges on November 16, 1990. The NPDES program requires all industrial facilities and municipalities of a certain size that discharge pollutants into waters of the United States to obtain a permit. Stormwater discharges into the San Francisco Bay region are commonly controlled through general and individual

[545] The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion.
[546] A Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) designed or used for collecting or conveying storm water; (ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works. The term MS4 also refers to the jurisdiction that operates such a system.

NPDES permits, which are adopted by the SWRCB (general permits) or SFRWQCB (individual permits), and are administered by the SFRWQCB. Water quality criteria in NPDES permits for discharges to receiving waters are based on criteria specified in the National Toxics Rule, the California Toxics Rule, and Basin Plans (discussed below). The USEPA requires NPDES permits to be revised to incorporate waste load allocations for TMDLs when the TMDLs are approved by USEPA (40 CFR 122).

CWA Section 402 Combined Sewer Overflow Control Policy

Combined sewer facilities are subject to Section 402(q) of the CWA, which codified the Combined Sewer Overflow Control Policy. Wet weather flows are governed by compliance with the nine minimum controls and long-term control plan requirements contained in the CSO Control Policy (59FR 18688-18698) and further described in Combined Sewer Overflows, Guidance for Nine Minimum Controls, USEPA 832-B-95-003 (May 1995). Communities with combined sewer systems are also expected to develop long-term CSO control plans that will ultimately provide for full compliance with the CWA, including attainment of water quality standards. The SFPUC implemented a Long-Term Control Plan (per the conditions of its NPDES Wastewater Discharge Permit) during the mid-1990s. The general goals for combined sewer systems under the CSO Control Policy are to provide storage capacity for wet weather flows, to maximize flow to treatment facilities, and to minimize CSO discharges. The requirements of the CSO Policy are implemented through the City's NPDES permits issued by the SFRWQCB.

CWA Section 404 Discharge of Fill or Dredge Materials

Section 404 of the CWA regulates temporary and permanent fill and disturbance of wetlands and waters of the United States. The discharge (temporary or permanent) of dredged or fill material into waters of the United States, including wetlands, typically requires authorization from USACE pursuant to Section 404 of the CWA through either a Nationwide (general categories of discharges with minimal effects) or Individual Permit. USACE-regulated activities under Section 404 involve the discharge of dredged or fill material, including, but not limited to, grading, placing riprap for erosion control, pouring concrete, laying sod, and stockpiling excavated material, into waters of the United States. Activities that generally do not involve a regulated discharge (if performed specifically in a manner to avoid discharges) include driving pilings, some drainage channel maintenance activities, constructing temporary mining and farm/forest roads, and excavating without stockpiling. The USEPA and the USACE have issued Section 404(b)(1) Guidelines (40 CFR 230) that regulate dredge and fill activities, including the water quality aspects of such activities. Subpart C Sections 230.20 through 230.25 contain water quality regulations applicable to dredge and fill activities. Among other topics, these guidelines address discharges that alter substrate elevation or contours, suspended particulates, water clarity, nutrients and chemical content, current patterns and water circulation, water fluctuations (including those that alter erosion or sediment rates), and salinity gradients.

River and Harbors Act Section 10

The *Rivers and Harbors Acts of 1890* (superseded) and *1899* (33 USC 401, et seq.) are the legislative origin of the USACE regulatory program. Various sections establish permit requirements to prevent unauthorized obstruction or alteration of any navigable water of the United States. Regulations implementing Section 10 of the *Rivers and Harbors Act* are coordinated with CWA Section 404 regulations. Section 10 (33 USC 403) covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would affect the course, location, condition, or capacity of those waters. Activities requiring Section 10

permits include structures (e.g., piers, wharfs, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the navigable waters of the United States. Bridge construction does not require a Section 10 permit, but does, however, require authorization for discharges of fill or dredge material under CWA Section 404.[547]

Executive Order 11988-Floodplain Management

Executive Order 11988 requires federal agencies to recognize the values of floodplains and to consider the public benefits of restoring and preserving floodplains. Under this order, the USACE has the responsibility for reviewing flood protection projects that may affect navigable waters. The USACE is required to take action and provide leadership to avoid development in the base floodplain; reduce the risk and hazard associated with floods; minimize the impact of floods on human health, welfare, and safety; and restore and preserve the beneficial and natural values of the base floodplain.

National Flood Insurance Act and Flood Disaster Protection Act

The *National Flood Insurance Act of 1968* and the *Flood Disaster Protection Act of 1973* were enacted to reduce the need for flood protection structures and to limit disaster relief costs by restricting development in floodplains. FEMA was created in 1979. One of its duties is to administer the NFIP and to develop standards for fluvial and coastal floodplain delineation. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages.[548]

The preliminary FIRM for San Francisco identifies several areas along the San Francisco bayfront, including Bayview Hunters Point, HPS Phase II, and Candlestick Point as coastal flood hazard zones, including a Zone A designation (in areas subject to inundation by tidal surge) and a Zone V designation (high coastal flooding zones subject to wave hazards) (SFHAs). Refer to Figure III.M-4. The City Administrator has submitted comments on the preliminary FIRM to FEMA, which questions the inclusion of portions of the Project site in a Zone V SFHA. The City Administrator has suggested it may seek a variance from FEMA if a final FIRM retains the SFHAs identified on the preliminary FIRMs. If the Project site is deemed to be within an area defined as a SFHA on a final FIRM, published prior to development of the Project, the Project would be subject to applicable floodplain development requirements.

State

Responsibility for the protection of water quality in California resides with the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs). The SWRCB establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and state water quality statutes and regulations. The RWQCBs develop and implement Water Quality Control Plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. The San Francisco Bay Region Regional Water Quality Control

[547] California Natural Resources Agency, website: http://ceres.ca.gov/wetlands/permitting/RHA_summary.html, accessed July 16, 2009.
[548] Federal Emergency Management Agency, National Flood Insurance Program, Available at: www.fema.gov/business/nfip/, Accessed: June 19, 2008.

Board (SFRWQCB) implements a number of federal and State laws, the most important of which are the *State Porter-Cologne Water Quality Control Act* and the federal CWA.

Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* (PCWQCA) is the principal law governing water quality in California. Under the PCWQCA, the SWRCB and the nine RWQCBs were established as statewide and regional water quality planning agencies, respectively. The PCWQCA requires the development of statewide and regional Water Quality Control Plans (Basin Plans) to protect the quality of surface water and groundwater. The SWRCB and RWQCBs are required to designate beneficial uses of surface waters and groundwater, establish water quality objectives to protect beneficial uses, and develop implementation programs to meet the water quality objectives. The SWRCB and RWQCBs have permitting and enforcement authority to prevent and control waste discharges that could affect waters of the state through the issuance of NPDES permits and WDRs. The Project site is located in the San Francisco Bay Basin and subject to regulatory requirements of the SFRWQCB.

State Implementation Plan for Toxics Standards for Surface Waters

In March 2000, the SWRCB adopted the State Implementation Plan (SIP) in Resolution No. 2000-015. The SIP establishes (1) implementation provisions for priority pollutant criteria promulgated by the USEPA through the National Toxics Rule (40 CFR 131.36) (promulgated on December 22, 1992 and amended on May 4, 1995) and through the California Toxics Rule (40 CFR 131.38) (promulgated on May 18, 2000 and amended on February 13, 2001), and for priority pollutant objectives established by RWQCBs in their Water Quality Control Plans; (2) monitoring requirements for 2,3,7,8-TCDD equivalents (dioxin); and (3) chronic toxicity control provisions. In addition, this policy includes special provisions for certain types of discharges and factors that could affect the application of other provisions in this policy. A list of priority pollutants and associated criteria can be found in the CFR, Section 40, Part 131 (Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the state of California, May 18, 2000).

California Toxics Rule (CTR)

In cases where the Basin Plan does not contain a standard for a particular pollutant, other criteria are used to establish a standard. These may be applied from SWRCB documents (e.g., the Inland Surface Waters Plan and the Pollutant Policy Document) or from water quality criteria developed under Section 304(a) of the CWA (e.g., California Toxics Rule). Numeric criteria are required by the CWA for many priority toxic pollutants. However, in 1994, a state court overturned the state's water quality control plans containing water quality criteria for priority toxic pollutants. To address the issue of toxic pollutants, on May 18, 2000, the USEPA promulgated the California Toxics Rule based on the Administrator's determination that numeric criteria are necessary in the State of California to protect human health and the environment. These federal criteria are numeric water quality criteria for priority toxic pollutants and other provisions for water quality standards legally applicable in the state of California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA.

Waste Discharge Requirements (WDRs) Program

Under the PCWQCA, the RWQCBs regulate the "discharge of waste" to "waters of the State". All parties proposing to discharge waste that could affect waters of the state must file a report of waste discharge (ROWD) with the appropriate RWQCB. The RWQCB then responds to the ROWD by issuing WDRs in a public hearing, or by waiving WDRs (with or without conditions) for the proposed discharge.

Both of the terms "discharge of waste" and "waters of the State" are broadly defined in the PCWQCA, such that discharges of waste include fill, any material resulting from human activity, or any other discharge that may directly or indirectly impact waters of the State. While all waters of the United States that are within the borders of California are also waters of the State, the converse is not true; waters of the United States are a subset of waters of the State.

While Section 404 permits and 401 certifications are required when the an activity results in fill or discharge directly below the ordinary high water line of waters of the United States, any activity that results or may result in a discharge that directly or indirectly impacts waters of the state or the beneficial uses of those waters are subject to WDRs. In practice, most RWQCB rely on applications for 401 certification to determine whether WDRs also need be issued for a proposed project. The SFRWQCB has produced a combined 401 certification/waiver of WDRs application form to ensure that applicants do not need to file both a ROWD and an application for 401 certification. WDRs for discharges directly to surface waters are also NPDES permits.

Anti-Degradation Policy

A key policy of California's water quality program is the State's Antidegradation Policy. This policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California (SWRCB Resolution No. 68-16), restricts degradation of surface and ground waters. In particular, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses. Under the Antidegradation Policy, any actions that can adversely affect water quality in all surface and ground waters must (1) be consistent with maximum benefit to the people of the state; (2) not unreasonably affect present and anticipated beneficial use of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies, (i.e., will not result in exceedances of water quality objectives).[549]

Construction General Permit

Pursuant to the CWA Section 402, discharges from construction projects are prohibited unless such practices comply with an NPDES permit. The SWRCB adopted a statewide *NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit) (Order No. 2009-0009-DWQ, NPDES No. CAS000002) on September 2, 2009 to meet CWA requirements and the water quality goals of the PCWQCA. Every construction project that disturbs one or more acres of land surface (or that is part of a common plan of development or sale that disturbs more than one acre of land) requires coverage under the Construction General Permit. To obtain coverage under

[549] SWRCB, 1968, Statement of Policy with Respect to Maintaining High Quality of Waters in California. Resolution No. 68-16.

the Construction General Permit, the landowner or other applicable entity must file Permit Registration Documents (PRDs) prior to the commencement of construction activity, which include a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other documents required by the Construction General Permit. Every regulated construction project is required to seek coverage under the new Construction General Permit by July 1, 2010. Because the Project would disturb more than one acre, construction of the Project would be subject to the Construction General Permit requirements.

Construction activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation, that result in soil disturbances of at least one acre of total land area. The SWPPP that must be prepared by every individual construction project under the Construction General Permit has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges; and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater, as well as non-stormwater discharges. BMPs must be implemented to meet the performance standard of Best Available Technology/Best Conventional Technology (BAT/BCT).[550]

The Construction General Permit requires specific minimum BMPs, depending upon the project sediment risk (Risk Level 1 through 3). Sediment risk is determined based on the sensitivity of the receiving water to sediment and the potential for site erosion and sediment transport. For moderate sediment risk projects (Risk Level 2), Numeric Action Levels (NALs) for turbidity and pH are imposed, and for high sediment risk projects (Risk Level 3), Numeric Effluent Limitations (NELs) for turbidity and pH are imposed. Post-construction stormwater performance standards are also included for sites not covered by a municipal stormwater permit. The Construction General Permit requires effluent and receiving water (only for some Risk Level 3 sites) monitoring to demonstrate compliance with permit requirements, and corrective action must be taken if these limits are exceeded. The results of monitoring and corrective actions must be reported annually to the SWRCB. This permit also specifies minimum qualifications for SWPPP developers and construction site inspectors.

Industrial General Permit

Pursuant to the CWA Section 402(p), the SWRCB has issued a statewide *NPDES General Industrial Permit for Discharges of Storm Water Associated with Industrial Activities* (Industrial General Permit)(Order No. 97-03-DWQ, NPDES General Permit No. CAS000001). A wide range of industries is covered under the Industrial General Permit, as determined by the facility Standard Industrial Classification (SIC) code, a four-digit code that refers to the type of business conducted.

The Industrial General Permit requires control of pollutant discharges using BAT/BCT to meet water quality standards specified in the Basin Plan. The Industrial General Permit generally requires facility operators to (1) eliminate unauthorized non-stormwater discharges; (2) develop and implement a SWPPP; and (3) perform monitoring of stormwater discharges and authorized non-stormwater discharges.

[550] As defined by USEPA, Best Available Technology (BAT) is a technology-based standard established by the CWA as the most appropriate means available on a national basis for controlling the direct discharge of toxic and non-conventional pollutants to navigable waters. The BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable. Best Conventional Technology (BCT) is a technology-based standard that applies to treatment of conventional pollutants, such as total suspended solids.

In 2005, the SWRCB issued a Draft Final Industrial General Permit that revises the current permit from 1997. Significant changes include modifications to SWPPP requirements, the monitoring program, and group monitoring requirements. In addition, the Draft Final Permit includes parameter benchmarks[551] for certain indicator parameters based on USEPA's Multi-Sector Permit, as an additional method to evaluate the effectiveness of BMPs. Under the current 1997 permit, light industry was excluded from coverage if there was no exposure of industrial materials to stormwater. Under the Draft Final permit, such facilities would not be automatically excluded from coverage but would need to apply for a Conditional Exclusion. To obtain this exclusion, dischargers must submit a certification for a Conditional Exclusion to demonstrate that there would be no contact of pollutants with stormwater.

Industrial stormwater discharges from HPS Phase II are regulated under the Industrial General Permit. It is possible that future tenants within the Project site may include industrial facilities that would be covered under the Industrial General Permit. For example, a marina classified as SIC 4493 is required to obtain coverage under the Industrial General Permit if vehicle maintenance activities such as rehabilitation, mechanical repairs, painting, fueling, and lubrication or equipment cleaning operations are conducted.

Municipal Stormwater General Permit

The SWRCB regulates discharges from MS4s under a Phase I program for medium and large municipalities (serving 100,000 or more people) and under a Phase II program for small municipalities (serving 100,000 or less people), and governmental facilities such as military bases and public campuses. The relatively small portions of the City that drain to MS4 areas (approximately 10 percent of the City) are regulated under the statewide *Phase II NPDES General Permit for Storm Water Discharges from Small MS4s* (Municipal Stormwater General Permit)(Order No. 2003-0005-DWQ).

In accordance with the Municipal Stormwater General Permit, the City must develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4 by ensuring that post-construction controls are in place that would prevent or minimize water quality impacts. The Municipal Stormwater General Permit requires covered municipalities to prepare a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent possible (MEP), as defined in and implemented by the General Permit. The MEP approach is an ever evolving, flexible, and advancing

[551] The Draft Final 2005 Industrial General Permit contains parameter benchmark concentrations for constituents commonly found in stormwater runoff from industrial facilities (indicator parameters), which are derived from USEPA's Multi-Sector General Permit; the Multi-Sector General Permit provides coverage for industrial facilities located in five states, in certain Native-American lands, as well as for various federal facilities, where USEPA is the NPDES permit authority. The benchmarks are not numeric effluent limits; however, the benchmarks represent pollutant concentrations above which are levels of concern. The benchmarks will be used in the Draft Final Permit to evaluate if the facility's Best Management Practices (BMPs) are effective in reducing concentrations of pollutants, but are not intended to be used to determine whether or not discharges are causing or contributing to a water quality impairment. The Draft Final Permit requires that if runoff concentrations are above one or more benchmarks, the discharger must revise its Storm Water Pollution Prevention Plan (SWPPP) to include more effective BMPs, and collect samples from the next two consecutive qualifying storms. Industrial facilities regulated under the Industrial General Permit are currently not subject to the parameter benchmarks; however the benchmarks will take effect when the Draft Final Permit is adopted.

concept, which considers technical and economic feasibility. Consequently, the definition of MEP evolves with an increased knowledge about controlling urban runoff.

In accordance with the Municipal Stormwater General Permit, the SWMP must describe Minimum Control measures—BMPs, measurable goals, and timetables for implementation—in the following six program areas: (1) Public Education; (2) Public Participation; (3) Illicit Discharge Detection and Elimination; (4) Construction Site Storm Water Runoff Control; (5) Post Construction Stormwater Management; and (6) Pollution Prevention/Good Housekeeping for Municipal Operations.

The SFPUC has prepared a SWMP that establishes a framework for achieving the MEP standard for the discharge of pollutants from MS4s within their jurisdiction in accordance with the Phase II stormwater regulations. Additionally, the City has developed Draft San Francisco Stormwater Design Guidelines in compliance with the Municipal NPDES Permit requirements that are expected to be approved and adopted by December 2009.

In the operational phase of the Project, stormwater discharging to areas served by the combined sewer system would be regulated under the Wastewater Discharge NPDES Permit, described further below. However, at build out, the Project site would be served by a separate storm sewer system and subject to the requirements of the Municipal Stormwater General Permit and associated SWMP and San Francisco Stormwater Guidelines, described further below.

Recycled Water General Permit for Landscape Irrigation

In July 2009, the SWRCB released General Waste Discharge Requirements for Landscaping Irrigation Uses of Municipal Recycled Water (Recycled Water General Permit), allowing municipal entities to distribute disinfected tertiary-treated recycled water to select customers for landscape irrigation (Order No. 2009-0006-DWQ). The Recycled Water General Permit is intended to further the state's Recycled Water Policy (*California Code of Regulations* [CCR] Title 22) and *California Water Code* Section 13552.5, both of which encourage recycled water for non-potable uses.

Under the Recycled Water General Permit, "recycled water" is limited to recycled water produced by a public entity at a municipal wastewater treatment plant. The Recycled Water General Permit does not apply to water produced from the treatment of other non-municipal wastewaters (e.g., oil field production, food processing, stormwater, etc.) and other types of treatment facilities (e.g., industrial wastewater treatment plants). To obtain coverage under the Recycled Water General Permit, the producer/distributor of recycled water must submit a Notice of Intent (NOI) and Operations and Maintenance Plan to the SWRCB. The Operations and Maintenance Plan must contain a detailed operations plan for use areas, including procedures for implementation of regulations regarding recycled water use and maintenance of equipment and emergency backup systems to maintain compliance with the conditions of the Recycled Water General Permit. In addition, it must have an irrigation management plan specifying measures to ensure that recycled water is applied efficiently, at an agronomic rate, and using practices necessary to minimize application of salinity constituents to use areas. Characteristics of the soil, the recycled water, plant species being irrigated, climatic conditions, and other relevant conditions must be considered in this plan.

The Recycled Water General Permit notes that the use of recycled water may not be appropriate for all scenarios because of unique site-specific characteristics and conditions. In addition, because there are

certain public health concerns associated with recycled water, the Recycled Water General Permit includes exposure control measures, including minimum setback distances, signage, method of application, and use restrictions and only allows use of water treated to CCR Title 22 tertiary treatment requirements. Other potential public health issues, such as cross-contamination of recycled water and potable water sources, control of recycled water salinity, and chlorination are regulated under the Recycled Water Policy and the *Water Code*. If the Project would use recycled water, landscape irrigation with recycled water would require coverage under this Recycled Water General Permit or an individual permit.

SWRCB Low Impact Development Policy

On January 20, 2005, the SWRCB adopted the Low Impact Development (LID) Policy which, at its core, promotes the idea of "sustainability" as a key parameter to be prioritized during the design and planning process for future development. The SWRCB has directed its staff to consider sustainability in all future policies, guidelines, and regulatory actions.

The sustainability practice promotes LID to benefit water supply and contribute to water quality protection. LID has been a proven approach in other parts of the country and is seen in California as an alternative to conventional stormwater management. The RWQCBs are advancing LID in California in various ways, including provisions for LID requirements in renewed Phase I municipal stormwater NPDES permits.

San Francisco Bay Basin Plan

As a function of the PCWQCA, the Basin Plan[552] identifies the beneficial uses, water quality objectives, and actions necessary to control non-point and point sources of pollution to receiving waters in the San Francisco Bay region. Existing and potential beneficial uses for the Lower Bay, as identified in the Basin Plan, are industrial service supply; ocean, commercial and sport fishing; shellfish harvesting; estuarine habitat; fish migration; preservation of rare and endangered species; fish spawning; wildlife habitat; water contact recreation; non-contact water recreation; and navigation. Existing and potential beneficial uses of the Islais Valley, South San Francisco, and Visitacion Valley groundwater basins are municipal and domestic water supply (potential), industrial process water supply (existing), industrial service water supply (existing), and agricultural water supply (potential).

Basin Plan narrative and numeric water quality objectives are used to define appropriate levels of environmental quality and to control activities that could adversely affect individual aquatic systems and the Bay Basin in general. The narrative water quality objectives describe pollution conditions to be avoided but no numeric limit is imposed. The numeric water quality objectives describe the maximum concentrations of a given pollutant that can remain in a body of water without adversely affecting the aquatic system. Beneficial uses, together with applicable water quality objectives, comprise the relevant water quality standards.

[552] California Regional Water Quality Control Board San Francisco Bay Region (SFRWQCB), *2007,* op. cit.

Water Quality Control Plan for Enclosed Bays and Estuaries

The SWRCB adopted Part 1 of the Water Quality Control Plan for Enclosed Bays and Estuaries in August, 2009 to comply with the requirements of *California Water Code* Section 13393 to adopt State sediment quality objectives (SQOs). Part 1 integrates chemical and biological measures to accomplish two narrative SQOs: (1) to protect human health, and (2) to ensure that pollutants in sediments are present in quantities that, alone or in combination, are not toxic to benthic[553] communities in enclosed bays and estuaries of California.[554] Part 1 is not intended to address low dissolved oxygen, pathogens, or nutrients, including ammonia.

The narrative SOQs are to be implemented through a multiple lines of evidence (MLOE) approach. The MLOE approach includes periodic assessment of three indicators ("lines of evidence"): sediment toxicity, benthic community condition, and sediment chemistry. Part 1 specifies testing and assessment procedures for these indicators as well as guidelines for interpretation. With respect to dredging, Part 1 states that the RWQCB "shall not approve a dredging project that involves the dredging of sediment that exceeds the objectives in Part 1." Moreover, the SWRCB must apply SQOs as receiving water limits if discharge of a toxic pollutant to bay or estuarine waters has the reasonable potential to cause or contribute to an exceedance of the SQOs. Exceedance of the SQO could constitute violation of an NPDES permit, such as a municipal stormwater permit.

Cleanup of contaminated sediment is subject to Resolution No. 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under *Water Code* Section 13304). Part 1 also allows the RWQCB to develop site-specific sediment management guidelines where appropriate, for example, where toxic stressors have been identified and controllable sources of these stressors exist or remedial goals are desired.

Wastewater Discharge Permit (Combined Sewer System)

Discharges from the SWPCP, NPWWF, and BWWF are regulated under the NPDES permit[555] set forth in Order No. R2-2008-0007 and NPDES No. CA0037664. This NPDES permit does not apply to all wastewater collection systems and CSOs within the City and County of San Francisco, but is specific to the facilities referenced in this NPDES permit. Because the Project would discharge to these permitted facilities, the Wastewater Discharge Permit is an applicable WDR for evaluation of potential Project impacts.

This NPDES permit includes technology-based effluent limits for dry and wet weather discharges, water quality-based effluent limits for dry weather discharges from the SWPCP, receiving water limitations based on water quality objectives in the Basin Plan, and various additional provisions, such as monitoring and reporting program requirements. This NPDES permit also requires adherence to provisions consistent with the CSO Control Policy (refer to the above discussion under Federal CWA, Combined Sewer Overflow Control Policy), which include:

- Revision and update of a Combined Sewer System Operation and Maintenance Plan

[553] Living on or in bottom of the ocean, bays, and estuaries, or in the streambed.
[554] Enclosed bays include all bays where the narrowest distance between headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. This definition includes San Francisco Bay.
[555] An NPDES Permit is also a waste discharge requirement (WDR).

- Implementation of the nine minimum technology-based controls
- Conduct proper operations and regular maintenance programs
- Maximize use of the collection system as inline storage capacity
- Review and modify the pretreatment program if practical and feasible
- Maximize the flow to the SWPCP and NPWWF during wet weather flow conditions
- Prohibit CSOs during dry weather
- Control solid and floatable materials by ensuring that overflows are baffled or volumes of floatables are reduced by other means, and removing materials captured in the storage/transport system prior to discharge to receiving waters
- Develop and implement a pollution prevention program focused on reducing the impact of CSOs on receiving waters
- Notify the public of overflows
- Monitor wet weather outfalls to effectively characterize overflow impacts and the efficacy of CSO controls

Long-Term Control Plan

The City has implemented the Long-Term Control Plan required by the CSO Policy by designing and constructing facilities to capture and treat 100 percent of the sewage and stormwater generated in combined sewer areas within the City. Provisions of the Long-Term Control Plan include:

Wet Weather Performance Criteria. The City designed its combined sewer system based on historical rainfall to achieve the long-term average goal of only one CSO event per year along the southeast sector of the City. This wet weather performance criteria is a long-term average and will not be used to determine compliance or non-compliance with the NPDES permit because rainfall patterns vary.[556]

Wet Weather Operation of Bayside Facilities. Specific activation and operation criteria for pump stations and facilities of the Bayside Facilities are required. Activation and operation of these facilities depends on rainfall, forecasts, and storage conditions in the North Drainage Basin and the Central Drainage Basin.

Post Rain Activities. Treatment at the SWPCP and NPWWF continues until North, Central and Southeast Drainage Basin storage/transports are substantially empty of stormwater flows.

The combined storm sewer treatment program, implemented by the City and the SFPUC in compliance with the CSO Control Policy and the NPDES permit, provides 100 percent capture and treatment of the combined sewer flows rather than the 85 percent minimum as required by the CSO Control Policy. San Francisco has no untreated overflow events because the combined flows receive the equivalent of primary treatment within the storage/transport boxes. Primary treatment of these overflows consists of removal of floatable materials and settleable solids. Portions of the Project site currently discharge both stormwater and wastewater to the combined storm sewer system.

[556] The SWRCB recognizes that some years are wetter than others and may contribute more flow than anticipated in the system design criteria.

Temporary Construction Dewatering Requirements for Separate Storm Sewer Areas

Generally speaking, for construction occurring in areas not served by a combined sewer system and depending on the nature and degree of residual groundwater contamination present when construction begins, temporary groundwater dewatering could be required and would be regulated under the Construction General Permit for minor amounts of dewatering of non-polluted groundwater; one of three NPDES general dewatering permits issued by the SFRWQCB, depending on the residual pollutants in a particular portion of a site; or an individual NPDES Permit/WDR if none of the General Permits are applicable. The three SFRWQCB dewatering general permits are as follows:

- Order No. R2-2004-0055 NPDES No. CAG912003, General Waste Discharge Requirements for: Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds
- Order No. R2-2006-0075 NPDES No. CAG912002 General Waste Discharge Requirements for: Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Fuel Leaks and Other Related Wastes at Service Stations and Similar Sites
- Order No. R2-2007-0033, NPDES No. CAG912004. General Waste Discharge Requirements for: Discharge or Reuse of Extracted Brackish Groundwater and Reverse Osmosis Concentrate Resulting from Treatment of Groundwater by Reverse Osmosis and Discharge and Reuse of Extracted and Treated Groundwater Resulting from Structural Dewatering.

The above general permits could also apply to the operational phase of a project if significant dewatering was required to the separate storm drain system within areas of contaminated groundwater or if long term dewatering were required (e.g., a below-grade parking lot installed below the local water table). If none of the dewatering general permits were applicable to a project or a specific temporary dewatering activity, an individual NPDES permit with WDRs could be required.[557]

Long-Term Management Strategy for the Placement of Dredged Material

In 1990 the USEPA, USACE, SWRCB, and BCDC joined with navigation interests, fishing groups, environmental organizations, and other interested parties to form the Long-Term Management Strategy (LTMS) program for dredged material from the San Francisco Bay Area. The LTMS provides the basis for uniform federal and state dredged material disposal policies and regulations. The California Coastal Conservancy, CDFG, and US Fish and Wildlife Service also participate in the LTMS as necessary to implement beneficial reuse options. The goals of the LTMS are to manage dredging and dredge material disposal in an economically and environmentally sound manner, maximize the beneficial use of dredged material, and develop a coordinated permit application review process for dredging and disposal projects. Specific guidance for conducting dredging and material disposal activities is summarized in the LTMS Management Plan.[558]

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[557] Farhad Azimzadeh, San Francisco Bay Regional Water Quality Control Board, Enforcement, General Permits, Pretreatment Section, telephone communication with BASELINE Environmental Consulting, December 16, 2008.
[558] US Army Corps of Engineers, USEPA, BCDC, and Water Board, *Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay, Management Plan 2001.*

The Dredged Material Management Office (DMMO) was established as part of the LTMS to consolidate the processing of dredging permit applications by the staff of the LTMS agencies and the State Lands Commission. (The State Lands Commission holds title to all ungranted tide and submerged lands in California, including some tidelands and submerged lands in the Project site.) The DMMO provides a single application form that meets the requirements of its member agencies and unified processing of applications for dredging permits.

The process for obtaining approvals for dredging or dredge materials disposal has three phases: (1) suitability determination, (2) permit process, and (3) episode approval. The suitability determination process occurs at the DMMO level. The DMMO member agencies make a joint recommendation to the individual member agencies on whether the sediments to be dredged are appropriate, in terms of potential for environmental impacts, for the proposed disposal or reuse site. The recommendation is usually based on the results of sediment testing. The applicant must submit results from recent sediment testing or submit sufficient data to support a finding by the agencies that the sediments are suitable for the proposed disposal environment. The applicant should submit to the DMMO either a sediment Sampling and Analysis Plan and Quality Assurance Project Plan, or a written request (with supporting information) requesting an exclusion from testing requirements based on factors such as previous testing history and physical characteristics of the material proposed for dredging, if applicable. The applicant must submit the sampling results to the DMMO for review, and the DMMO would make a decision about where the materials can be disposed.

Section 404 of the CWA and BCDC's Bay Plan do not authorize aquatic disposal of dredged material unless an analysis of potential alternatives is first performed and the alternatives prove to be either environmentally unacceptable or infeasible. In order for projects proposing the discharge of dredged material to waters of the United States to be approved under Section 404 of the CWA, it must be shown that there is no practicable alternative to the proposed discharge that would have less impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. Applicants for permits to dispose of dredge spoils must submit a written analysis of the alternatives to the DMMO. The DMMO has developed a list of questions to guide applicants in preparing the discussion.

Although the DMMO provides initial review of permit applications and suitability recommendations, applicants must eventually obtain separate approval from the appropriate DMMO member agencies (such as CWA Section 404 Permit from USACE, CWA Section 401 Water Quality Certification from the SFRWQCB, and approval by BCDC); each agency issues permit conditions and specific requirements about how the project is to be performed.

Some permits for maintenance dredging projects authorize multiple dredging and disposal episodes over a period of several years. Such permits require that permittees obtain formal approval, after a recommendation of suitability by the DMMO, for each dredging episode under the permit. Episode approvals, when required, are issued by the individual DMMO member agencies.

San Francisco Bay Conservation and Development Commission

The BCDC is a federally designated state coastal management agency for the San Francisco Bay. In accordance with the *McAteer-Petris Act of 1965*, the BCDC is responsible for maintaining and carrying out the policies of the San Francisco Bay Plan (Bay Plan). Bay shoreline construction projects, such as filling or dredging in the Bay, work adjacent to certain tributaries to the Bay, work adjacent to or within salt

ponds, and work adjacent to managed wetlands around the Bay, or grading within 100 feet of the Bay shoreline, require permit approval from the BCDC. The BCDC issues an Administrative Permit for minor repairs or improvements along the Bay shoreline and a Major Permit for more extensive projects.

The Bay Plan, adopted in 1969 and more recently amended in 2008, specifies goals, objectives and policies for existing and proposed waterfront land uses use and other BCDC jurisdictions. Part III of the Bay Plan contains findings and policies pertinent to the development of the Project.

The Project would involve the construction of a marina, a bridge across Yosemite Slough, and various shoreline improvements. Such activities would require a permit from BCDC.

Joint Aquatic Resources Permit Application

The Joint Aquatic Resources Permit Application (JARPA) process streamlines federal, state, and local environmental permitting processes for applicants proposing construction, fill placement, public access impingement, and other development activities that occur along the San Francisco Bay and the coastline, including projects near or in wetlands or creeks that flow to the Bay. Under the JARPA process, agencies that would regulate the Project such as the SWRCB, SFRWQCB, BCDC, and the California Department of Fish and Game (CDFG), receive the same permit application information, which may improve coordination between the agencies. Generally, the project must comply with CEQA requirements before various agencies issue permits under JARPA. Examples of certifications/permits that can be issued under JARPA include CWA Section 401 and Section 404 permits.

Local

City of San Francisco General Plan

Refer to Land Use and Plans of this EIR for a description of the General Plan. Objectives and policies relevant to water quality and hydrology are found in the Environmental Protection element and are listed below:

Objective 1	Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.	
	Policy 1.1	Conserve and protect the natural resources of San Francisco.
	Policy 1.2	Improve the quality of natural resources.
	Policy 1.4	Assure that all new development meets strict environmental quality standards and recognizes human needs.
Objective 2	Implement broad and effective management of natural resources.	
Objective 3	Maintain and improve the quality of the bay, ocean, and shoreline areas.	
	Policy 3.1	Cooperate with and otherwise support regulatory programs of existing regional, state, and Federal agencies dealing with the Bay, Ocean, and Shorelines.

Storm Water Management Plan

In January 2004, San Francisco completed a SWMP for those portions of the City discharging to MS4s, in compliance with the Municipal Stormwater General Permit.[559] The SWMP does not apply to those areas of the City where stormwater discharges into the combined sewer system, portions of Candlestick Point managed by the California Department of Parks and Recreation, or HPS Phase II, which is covered under the Industrial General Permit. Thus, at this time, only those portions of the Candlestick Point served by MS4s under the jurisdiction of the SFPUC would require compliance with the San Francisco SWMP. If development proceeded and separate storm sewer systems were installed, the Project site would become an MS4 area. Therefore, the entire Project site would require compliance with the San Francisco SWMP because the City must comply with the Municipal General Stormwater Permit conditions for MS4 areas. SWMP measures that could be applicable to the Project site would fall into five broad categories: (1) Public Education, (2) Public Participation, (3) Illicit Discharge Detection and Elimination, (4) Construction Site Storm Water Runoff Control, and (5) Post Construction Stormwater Management.

City of San Francisco Construction Site Water Pollution Prevention Program

The City of San Francisco Construction Site Water Pollution Prevention Program requires stormwater quality BMPs at all construction sites, regardless of the area of the site and whether the site drains to the combined or separate sewer system. Pollution prevention measures that must be implemented at all construction sites include:

- Develop SWPPP.
- Identify all storm drains and catch basins near the construction site and ensure all workers are aware of their locations to prevent pollutants from entering them.
- Protect all storm drain and catch basin inlets.
- Develop spill response and containment procedures.
- Inspect site regularly to ensure that BMPs are intact.
- Conduct daily site cleanings as needed.
- Educate employees and subcontractors about BMPs.
- Regularly maintain all BMPs at project site.

For sites that disturb one or more acres and drain to the separate sewer system, compliance with the Construction General Permit and preparation and implementation of a SWPPP that meets Construction General Permit conditions is required. For sites that discharge to the combined sewer system, a SWPPP that includes an Erosion and Sediment Control Plan and meets SFPUC requirements must be submitted.

San Francisco Green Building Ordinance

In 2008, the City adopted Chapter 13C (Green Building Requirements) into *San Francisco Building Code*. The purpose of the requirements is to promote the health, safety, and welfare of San Francisco residents, workers, and visitors by minimizing the use and waste of energy, water and other resources in the construction and operation of City's buildings and by providing a healthy indoor environment. The

[559] San Francisco Public Utilities Commission, *Storm Water Management Plan*, January 2004, available at: http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/361/MTO_ID/542 Accessed July 16, 2009.

ordinance requires compliance with the applicable LEED® performance standards for New Construction, Version 2.2, criteria SS6.1 and SS6.2 for stormwater management, as well as the BMPs and Stormwater Design Guidelines of the SFPUC (1304C.0.3). Additionally, for high-rise residential buildings (1304C.1.3), new group B and M occupancy buildings (1304C.2), and new large commercial buildings (1304C.2.2),water efficient landscaping (LEED® WE1.1) and water conservation are required (LEED® WE3.2).

LEED® SS6.2 addresses stormwater management and has been adopted by the San Francisco Stormwater Design Guidelines for MS4s. The stormwater management program seeks to reduce impervious cover, promote infiltration, and capture and treat 90 percent of the runoff from an average annual rainfall event (for semi-arid watersheds; in San Francisco, treatment of 90 percent is interpreted as treating runoff produced by a rain event generating 0.75 inches) using acceptable BMPs. In addition, BMPs used to treat runoff must be capable of removing 80 percent of the average annual post-development total suspended solid load contained in stormwater runoff. The BMPs are considered to meet these criteria if (1) they are designed in accordance with standards and specifications from a state or local program that has adopted these performance standards, or (2) there are filed performance monitoring data that demonstrate compliance with the criteria. LEED® WE1.1 addresses water efficient landscaping. Permit applicants must submit documentation verifying a minimum of 50 percent reduction in use of potable water for landscaping (compared to the mid-summer baseline case). LEED® WE3.2 addresses water use reduction. Permit applicants must submit documentation demonstrating achievement of a minimum 20 percent reduction in the use of potable water. Effective January 1, 2011, the required reduction in use of water is 30 percent (compared to the water use baseline calculated for the building [not including irrigation] after meeting the USEPA Energy Policy Act of 1992 requirements).[560] Although not specified in the Green Building ordinance, for the purposes of the project it was assumed that the reduction would be compared to the Maximum Applied Water Allowance established in the pending California Water Efficient Landscape Ordinance.[561]

City of San Francisco Codes

Storm Drain System Design Criteria

San Francisco Subdivision Regulations. In 1982, the San Francisco Bureau of Engineering prepared the San Francisco Subdivision Regulations, general guidelines for the planning and improvement of subdivided lands, pursuant to Section 1311 of the *San Francisco Subdivision Code*. Chapters IV, XIII, and XIV of the Subdivision Regulations contain standards pertaining to the design and capacity of storm sewer systems.

HPS Stormwater Design Guidelines. The SFPUC has prepared stormwater design standards for HPS referred to as the Design Criteria and Standards, Combined Sewer, Separate Sanitary and Storm Systems, and Upstream Stormwater Management Systems, Hunters Point Shipyard (HPS Stormwater Design Guidelines). These provisions currently apply to HPS through the HPS Subdivision process and it is anticipated that the HPS Subdivision Code will be amended to include Candlestick Point. In accordance with these regulations, and for both HPS Phase II and Candlestick Point storm drain systems, the specific design criteria are:

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[560] The Energy Policy Act of 1992 set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. The Act consists of twenty-seven titles detailing various measures designed to lessen the nation's dependence on imported energy, provide incentives for clean and renewable energy, and promote energy conservation in buildings.

[561] Arup, Candlestick Point / Hunters Point Shipyard Phase II Water Demand Memorandum, October 15, 2009.

- Piped storm drain systems designed for stormwater runoff from up to the 5-year storm event when flowing full or surcharged.
- Flow from the 5-year storm event up to the 100-year storm event conveyed in streets and drainage channel rights-of-way.

Public Works Code, Article 4.1

In compliance with the Municipal NPDES Permit, Article 4.1 (Section 123) of the *San Francisco Public Works Code*, the City requires that all dischargers must comply with all state and federal orders issued to the City including all of the City's NPDES permits. The *Public Works Code* also prohibits the discharge of hazardous waste (including stormwater runoff) and other pollutants that would violate the City's federal and state discharge permits. The following are specific provisions of Article 4.1 that apply to construction activities:

- **Construction Requirements for Areas Served by the Combined Sewer System.** For construction sites served by the combined sewer system, the City requires the development and implementation of a SWPPP, which includes an Erosion and Sediment Control Plan (ESCP), and compliance with the City's Construction Site Water Pollution Prevention Program, to reduce the impacts of construction site runoff. The SWPPP must be submitted to the SFPUC prior to the initiation of construction. The SFPUC conducts periodic inspections to ensure compliance with the SWPPP. Article 4.1 of the *San Francisco Public Works Code* also regulates the quantity and quality wastewater discharges (such as dewatering from construction sites) to the combined sewer system.
- **Construction Requirements for Areas Served by the Separate Sewer System.** For separate sewer systems, Article 4.1 requires compliance with applicable NPDES permits, including compliance with the Construction General Permit and preparation and implementation of a SWPPP, compliance with the SWMP, and compliance with the City's Construction Site Runoff Water Pollution Prevention Program, including implementation of erosion and sediment control BMPs.
- **Dewatering Discharges to the Combined Sewer System.** Discharges of temporary dewatering from construction sites to the combined sewer system are regulated by a Batch Wastewater Discharge permit issued by the SFPUC, under Article 4.1 of the *San Francisco Public Works Code*. As such, the Project Applicant must obtain a Batch Wastewater Discharge permit from the SFPUC prior to the beginning of groundwater dewatering to the combined sewer system. Specific permit terms and conditions are imposed by the SFPUC to maintain SFPUC's compliance with its own Wastewater Discharge Permit issued by the SFRWQCB. Under the Batch Wastewater Discharge permit, the discharge must meet specific numeric effluent limitations for toxic and conventional pollutants, and monitoring is required to ensure compliance.

San Francisco Stormwater Design Guidelines

The City, the SFPUC, and the Port have jointly developed the *Draft San Francisco Stormwater Design Guidelines* (Stormwater Design Guidelines)[562] that describe the planning, engineering, and regulatory framework for designing post-construction stormwater controls at the parcel level in the separate storm sewer areas in San Francisco. When finalized, the Stormwater Design Guidelines[563] are anticipated to apply to all projects greater than 5,000 square feet, and projects in areas subject to San Francisco's Green Building Ordinance.

[562] City of San Francisco, San Francisco Public Utilities Commission, and Port of San Francisco, 2009, o*p. cit.*
[563] Draft Stormwater Design Guidelines were released in February 2009[563] and are expected to be adopted by the end of 2009.

The Guidelines require applicants for new and redevelopment projects to prepare a Stormwater Control Plan (SCP) that demonstrates how the project will:

- Capture and treat a precipitation depth of 0.75 inch using volume-based BMPs (LEED® SS6.2) or
- Capture and treat a rainfall intensity of 0.2 inch per hour using flow-based BMPs

The SCP also requires inclusion of source control BMPs for the following portions of a development: 100,000 square foot commercial development, restaurants, retail gasoline outlets, automotive repair shops, and parking lots. The SCP requires development of an Operations and Maintenance Plan that identifies responsible parties, funding sources, maintenance activities and schedules for all BMPs.

Floodplain Management Program

FEMA Floodplain Management Program

The NFIP was created to provide financial backing for affordable flood insurance in exchange for the adoption of floodplain management regulations by communities participating in the program. On March 28, 2008, the San Francisco Board of Supervisors adopted Resolution No. 352-08, authorizing the City's enrollment in the NFIP. As a requirement for joining the NFIP, the City must adopt and enforce a floodplain management ordinance that governs new construction and substantial improvements to existing buildings in flood-prone areas. San Francisco subsequently adopted Ordinance No. 188-08 establishing a floodplain management program, and the interim controls in this ordinance will remain in place until FEMA has published the final FIRM for San Francisco, at which time San Francisco will adopt permanent controls for floodplain management. In July 2008, the City released Interim Floodplain Maps to implement the City's floodplain management ordinance until the final FIRMs are released by FEMA.

The NFIP regulations allow a local jurisdiction to issue variances to its floodplain management ordinance under certain narrow circumstances, without jeopardizing the local jurisdiction's eligibility in the NFIP. However, the particular projects that are granted variances by the local jurisdiction may be deemed ineligible for federally backed flood insurance by FEMA. In correspondence between the Office of the City Administrator and FEMA dated July 11, 2008,[564] the City advised FEMA of its intention to issue a variance in the permanent floodplain management controls to address the requirements for new construction and substantial improvements to structures on piers in coastal high hazard areas (V-Zones).[565] NFIP regulations prohibit construction seaward of mean high tide in a V-Zone, however, the City will develop engineering controls to ensure that structures built in or over the water can be constructed to withstand a 100-year flood if:

- The pier deck of the structure is above the 100-year elevation
- Companion engineering analysis of the structure demonstrates its ability to withstand lateral forces generated by a 100-year flood

[564] Linda Yeung, Deputy City Administrator, City and County of San Francisco Office of the City Administrator, letter to Gregory Blackburn, FEMA Region IX, July 11, 2008.
[565] Note that FEMA refers to these zones as both V-Zones and Zone V.

Although resolution of this issue with FEMA is pending, development within the Project site would be subject to the interim controls in the floodplain management program, unless alternative requirements are adopted prior to the issuance of building permits.

City of San Francisco

In August, 2008, the City of San Francisco adopted an ordinance establishing a floodplain management program (Article XX, Sections 2A.280 through 2A.285 of the *San Francisco Administrative Code*), designating the City Administrator as the floodplain administrator and providing requirements for designating floodplains and for construction and development in floodplains.

Development in a floodplain or flood-prone area, as designated by the Floodplain Administrator, requires a permit and demonstrated compliance with the floodplain management standards. Article XX, Sections 2A.280 through 2A.285 require that all new construction and substantial improvements in designated flood prone areas shall:

- Be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy
- Be constructed with materials and utility equipment resistant to flood damage and using methods and practices that minimize flood damage
- Include electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding

The ordinance requires that subdivision proposals in flood-prone areas be reviewed to ensure that:

- All such proposals are consistent with the need to minimize flood damage within the flood-prone area
- All public utilities and facilities such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage
- Adequate drainage is provided to reduce exposure to flood hazards

All new and replacement water supply and sanitary sewage systems must be designed to minimize or eliminate infiltration of flood waters into the systems, and discharges from systems into flood waters.

The Chief Harbor Engineer of the Port of San Francisco and the City Floodplain Administrator are required to consult and coordinate with FEMA to create appropriate building standards for developing any finger piers in flood prone areas within the Port's jurisdiction. The floodplain management regulations in this ordinance are consistent with the NFIP requirements for communities like San Francisco, where FEMA is in the process of preparing, but has not completed a final FIRM. When FEMA issues a final FIRM designating SFHAs in San Francisco, NFIP regulations require that the adopted floodplain management program be reviewed and modified by the City to ensure consistency with NFIP requirements applicable to FEMA-mapped communities.

III.M.4 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts related to hydrology and water quality, but generally consider that implementation of the Project would have significant impacts if it were to:

- M.a Violate any water quality standards or waste discharge requirements
- M.b Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)
- M.c Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on site or off site
- M.d Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site
- M.e Create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff
- M.f Otherwise substantially degrade water quality
- M.g Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- M.h Place within a 100-year flood hazard area structures that would impede or redirect flood flows
- M.i Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam
- M.j Expose people or structures to inundation by seiche, tsunami, or mudflow

Analytic Method

Hydrology and water quality would be affected by the amount of impervious surfaces, the introduction of new pollutants, migration of existing pollutants, and sea level rise. As described in Chapter II (Project Description), the Project would result in the demolition of existing surface improvements, reflective of past land uses within Candlestick Point and HPS Phase II, and the creation of new land uses, which could affect water quality in the Lower Bay. The focus of the hydrology and water quality analysis is on those portions of the Project site that would be subject to development, and both construction and operational impacts are addressed in this section. Criteria for evaluating effects on surface and groundwater quality in the San Francisco Bay Area are based on water quality standards established in the Basin Plan, including TMDLs, and whether the Project could cause or contribute to water quality degradation.

Additionally, Project impacts are assessed in light of existing regulatory requirements that would serve to mitigate potential impacts. The effectiveness of existing regulations to mitigate potential impacts is often affected by discretionary requirements, site characteristics or project features not yet detailed, and design-

level considerations. Because there is some discretion in how these regulations are applied, they are presented as mitigation measures to outline the specific process by which the Project will comply with these regulations.

Under the Project, existing improvements and impervious surfaces would be replaced with new structures and infrastructure, including roads, parking areas, and utilities. This would generally result in the replacement of impervious surfaces, because much of the area subject to development is already occupied by existing buildings and other impervious surfaces. The installation of new impervious surfaces and changes in site drainage patterns could increase the rate and amount of stormwater runoff from the Project site. Identification of impervious cover involved an analysis, using available Geographic Information Systems (GIS) data of existing land uses, to estimate the extent of coverage by existing structures, roads, parking lots, and other impervious surfaces. Site plans for the Project were analyzed to determine the extent of future impervious cover for the proposed future uses.

Stormwater Runoff

Potential Project operational effects on the amount of stormwater runoff were estimated based on Project changes in surface runoff characteristics, as affected by the amount of impervious surfaces, the time it would take runoff to travel to the storm drain system or directly to the Lower Bay, and precipitation records. Details of the stormwater runoff and pollutant load analysis are presented in Appendix M1. The construction and development of new land uses, compared to existing land uses and new or replaced infrastructure, could result in the introduction of various pollutants into stormwater runoff. Thus, the analysis also estimates the potential for an increase in runoff to occur and whether the introduction of new land uses would result in adverse impacts to water quality. At this time, runoff volumes and rates can only be estimated because the precise mix, size, and routing of stormwater BMPs that would be used to collect, treat, infiltrate, and discharge runoff have not been identified; the type of BMPs, their locations, and sizes could all affect stormwater flow by detention and retention.[566] Therefore, the runoff estimates do not include BMPs.

Stormwater Quality

Potential Project effects on water quality are estimated based on Project changes in land use and site runoff characteristics and reported literature values for pollutant concentrations in runoff from land use categories for some of the identified the constituents of concern (COCs). Annual pollutant loads for chemical constituents were estimated as a product of annual runoff volume and typical values for pollutant concentrations in stormwater runoff as a function of land use. As such, an increase in stormwater runoff would result in an increase in pollutant load, if expected pollutant concentrations in stormwater runoff from varying land uses remains the same or similar. Conversely, a reduction in stormwater runoff can still result in an increase in pollutant load if the concentration of the pollutant in stormwater runoff is expected to increase substantially. This calculation of pollutant loading provides an estimate of the relative amount (i.e., total pounds) of pollutant that would enter the receiving water during an average year. Not all COCs are included in the pollutant load analysis because sufficient data is not available. Details of the stormwater runoff and pollutant load analysis are presented in Appendix M1.

[566] Detention refers to slowing down, temporary storing, and releasing stormwater runoff at a controlled rate. Retention refers to capturing stormwater runoff and preventing discharge from the detention device. Retention can be accomplished by storage or infiltration.

Surface Water Constituents of Concern

Surface water COCs for the Project would include those pollutants likely to be present in stormwater runoff from the Project site and those for which the receiving water(s) (Lower Bay, Candlestick cove) are listed as impaired or for which there is an existing TMDL. COCs also include the pollutants of concern targeted by the SWMP, prepared in compliance with the Municipal Stormwater General Permit: suspended solids (sediments), litter, heavy metals, and petroleum hydrocarbons. Additionally, the potential for the Project to transport existing contaminants to surface waters are addressed in this impacts analysis. Table III.M-2 (Pollutants Likely to Be Present in Stormwater Runoff from Project Land Uses) lists the potential pollutants in stormwater runoff from the Project. Consequently, the Project COCs include sediment, nutrients, pesticides, oil and grease, metals (including mercury), trash and debris, pathogens, organic compounds (including PCBs), and oxygen-demanding substances and are described below.

- **Bacteria and Viruses (Pathogens).** Bacteria and viruses are common contaminants in stormwater. For separate storm drain systems, sources may include animal excrement and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to closures of water bodies to contact recreation such as swimming. Pathogens are not listed on the 303(d) list as impairing the water quality of the Lower Bay.
- **Metals.** Emissions from automobiles and many artificial surfaces of the urban environment (e.g., those covered with galvanized metal, paint, or preserved wood), contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Metals are often associated with sediments in stormwater. Metals are of concern because they are toxic to aquatic organisms and can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish, which can be a health hazard if consumed by other aquatic organisms or people). Mercury is a metal listed on the 303(d) list as impairing the water quality of the Lower Bay.

  Mercury in particular is a pollutant of concern in the Lower Bay and is the subject of a TMDL. Sources of mercury in urban runoff include mercury-containing instruments, switches and thermostats, and fluorescent lighting.[567]
- **Nutrients.** Nutrients including nitrogen and phosphorous are the major plant nutrients used for fertilizing landscapes, and are often found in stormwater. The discharge of nutrients into water bodies can cause excessive aquatic algae and plant growth (i.e., eutrophication) resulting in water body impairment. Nutrients are not listed on the 303(d) list as impairing the water quality of the Lower Bay.
- **Sediment.** Sediment is a common component of stormwater, and can be a pollutant. Sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it such as nutrients, trace metals, pesticides, and petroleum hydrocarbons. Sediments are not listed on the 303(d) list as impairing the water quality of the Lower Bay.

[567] L. Mckee and P. Mangarella, San Francisco Estuary Institute (SFEI) Poster: Mercury budget for stormwater conveyances in the San Francisco Bay Area: Towards achieving TMDL management goals for sediment and fish tissues, SFEI website: http://www.sfei.org/presentations_posters/MERCURYCONF_06/Mercury06_poster_mcKee_final.pdf, Accessed July 18, 2009.

Table III.M-2 Pollutants Likely to Be Present in Stormwater Runoff from Project Land Uses

	General Pollutant Categories								
Priority Project Categories	*Pathogens*	*Heavy Metals*	*Nutrients*	*Pesticides*	*Organic Compounds*	*Sediments*	*Trash & Debris*	*Oxygen Demanding Substances*	*Oil & Grease*
Residential Development	X		X	X		X	X	P[a]	P[b]
Commercial/Industrial Development	P[c]		P[a]	P[e]	P[b]	P[a]	X	P[e]	X
Parking Lots		X	P[a]	P[b]		P[a]	X	P[e]	X
Streets		X	P[a]		X[d]	X	X	P[e]	X

SOURCE: California Stormwater Quality Association, *Stormwater Best Management Practice Handbook- New Development and Redevelopment*, January, 2003.

X = Expected pollutant; P = Potential pollutant; a blank cell indicates the pollutant is neither an expected nor a potential pollutant

a. A potential pollutant if landscaping exists on site
b. A potential pollutant if the site includes uncovered parking areas
c. A potential pollutant if land use involves food or animal waste products
d. Including petroleum hydrocarbons
e. Including solvents

- **Trash and Debris.** Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and debris (biodegradable organic matter such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash and debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high oxygen demand in a water body causing degradation of water quality. In addition, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide. Trash and debris are not listed on the 303(d) list as impairing the water quality of the Lower Bay.
- **Oxygen-Demanding Substances.** Oxygen-demanding substances include biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. For example, food and pet wastes are oxygen-demanding substances. The oxygen demand of a substance can reduce the dissolved oxygen concentration of a water body and cause impairment such as fish kills. Oxygen-demanding substances are not listed on the 303(d) list as impairing the water quality of the Lower Bay.
- **Oil and Grease.** Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, improper disposal of cooking oils/fats at restaurants, and improper waste oil disposal. Oil and grease are not listed on the 303(d) list as impairing water quality of the Lower Bay.
- **Pesticides.** Pesticides (including herbicides, fungicides, rodenticides, and insecticides) have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. Pyrethroids, which are an emerging class of pesticide that is a primary replacement for pesticides recently phased out from urban use by USEPA (diazinon and chlorpyrifos), have been demonstrated to be toxic to organisms dwelling in the shallow sediments of California's surface water bodies; and it has been shown that toxicity is more severe and widespread in urban areas than in agricultural areas. The likely sources of the pyrethroids causing the identified toxicity are pest control applications around buildings and to a lesser extent, applications

on lawns and gardens. Legacy pesticides (e.g., chlordane, dieldrin, and DDT) are listed on the 303(d) list as impairing water quality of the Lower Bay.

- **Organic Compounds.** Organic compounds may be found in stormwater at concentrations that may be toxic to aquatic organisms. Man-made organic compounds (e.g., adhesives, cleaners, sealants, solvents) are widely applied, may be improperly stored and disposed, and come into contact with stormwater. In addition, illegal and deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways. Polychlorinated biphenyls (PCBs), dioxins, and furans are listed on the 303(d) list as causing impairing water quality of the Lower Bay.

  PCBs are specific pollutants of concern at the Project site because of the pending TMDL. PCBs were manufactured in the United States between 1929 and 1977 for a variety of uses, until USEPA banned the manufacture and distribution of materials containing detectable PCBs in 1984.[568,569] Therefore, PCB contamination often originates in older sites and materials (e.g., building caulk).[570] However, PCBs are still in use to some extent today (e.g., in transformers) and the potential for continued PCB releases into the environment remains.[571] PCBs in sediment originating from contaminated areas can come into contact with urban runoff and may be discharged into receiving waters.

Groundwater Constituents of Concern

COCs for groundwater quality are those chemicals that could rapidly reach the groundwater aquifer via infiltration of stormwater runoff, as well as those constituents that DWR indicates are elevated in local groundwater. The potential for residual contamination to mobilize and migrate as a result of implementation of the Project is addressed in this impacts analysis. Constituents in stormwater runoff that could infiltrate into groundwater are mobile constituents that would not be filtered or bound by soils located above the groundwater table. These constituents include total dissolved solids (measures the dissolved content of water including many constituents that are mobile), chloride, and nitrate. Nitrate and chloride are also groundwater COCs because DWR has indicated local groundwater may have elevated concentrations of these constituents. Total dissolved solids (TDS), chloride, and nitrate are described below.

- **Total Dissolved Solids.** Total dissolved solids (TDS) are commonly referred to as "salts," although metals and other dissolved solids can contribute to TDS concentrations. The source of salts (including nutrients) are the water soluble inorganic and organic constituents in imported water, soil materials/minerals, animal wastes, fertilizers and other soil amendments, land use, and industrial

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568 J.A. Davis, F. Hetzel, J.J. Oram, and L.J. McKee, "Polychlorinated biphenyls (PCBs) in San Francisco Bay", *Environmental Research* 105, 2007, pp. 67-86. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

569 L. Mckee and P. Mangarella, San Francisco Estuary Institute (SFEI) Poster: Mercury budget for stormwater conveyances in the San Francisco Bay Area: Towards achieving TMDL management goals for sediment and fish tissues, SFEI website: http://www.sfei.org/presentations_posters/MERCURYCONF_06/Mercury06_poster_mcKee_final.pdf, Accessed July 18, 2009. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

570 USEPA, PCBs in Building Caulk, website: http://www.epa.gov/waste/hazard/tsd/pcbs/pubs/caulk/index.htm, Accessed July 18, 2009.

571 Clean Estuary Project, PCB Implementation Plan Development, May 2006. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

wastes.[572] Water with a TDS above 500 mg/l is not recommended for use as drinking water (EPA secondary drinking water guidelines) and water with a TDS above 1,500 to 2,600 mg/l is generally considered problematic for irrigation use on crops with low or medium salt tolerance. [573] An elevated TDS concentration also indicates that groundwater may contain elevated levels of ions that are above the Primary or Secondary Drinking Water Standards, such as an elevated level of nitrate, arsenic, aluminum, copper, lead, and others.[574]

- **Chloride.** Sources of chloride could include seawater intrusion, thermal water, and dissolved minerals from marine and volcanic rocks.[575] Large concentrations of chloride can make water unusable for drinking and can also be toxic to plants.[576]
- **Nitrate.** The major sources of nitrates in urban groundwater are mostly related to wastewater disposal (including leaky sewers) and solid waste disposal.[577] Groundwater contamination by nitrate can occur as a result of sewage infiltration, water supply leakage, contaminated land, and highway and urban runoff.[578] High nitrate concentrations can cause methemoglobinemia (a blood disease) in infants.[579]

Flood Hazards

Criteria for evaluating flooding hazards are based on SFPUC stormwater drainage system design criteria and the proposed 100-year flood zones as established by FEMA and the City Administrator's Interim Floodplain Maps. Although a Base Flood Elevation has not been formally adopted for the Project site, the Base Flood Elevation was estimated by Moffatt and Nichol for this analysis.[580] In addition to the potential for the Project to increase runoff and cause or contribute to on- or off-site flooding hazards, given the proximity of the Project site to the Bay, the analysis also considers the potential for development to result in flooding hazards associated with a rise in sea level. These features would be designed to protect development at HPS Phase II from existing coastal flooding in addition to a rise in sea level of up to 16 inches with a development setback to allow any future increases in elevation to accommodate higher SLR values, should they occur.

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[572] SWRCB, 2009, State Water Resources Control Board Water Quality Order No. 2009-0006-DWQ General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water.
[573] Hartner, T., 2003, Reference: Groundwater Quality and Groundwater Pollution, University of California Division of Agriculture and Natural Resources Publication 8084.
[574] Wilkes University Center for Environmental Quality Environmental Engineering and Earth Sciences, No date, Total Dissolved Solids, http://www.water-research.net/totaldissolvedsolids.htm, Accessed October 7, 2009.
[575] Planert, M., and J.S. Williams, No date, Ground Water Atlas of the United States – Segment 1 California Nevada: Coastal Basins Aquifer North San Francisco Bay Area Valleys Ground-Water Quality, Hydrologic Investigations Atlas 730-B. http://ca.water.usgs.gov/groundwater/gwatlas/coastal/quality2.html. Accessed September 20, 2009.
[576] Planert, M., and J.S. Williams, No date, Ground Water Atlas of the United States – Segment 1 California Nevada: Coastal Basins Aquifer North San Francisco Bay Area Valleys Ground-Water Quality, Hydrologic Investigations Atlas 730-B. http://ca.water.usgs.gov/groundwater/gwatlas/coastal/quality2.html. Accessed September 20, 2009.
[577] Ibid.
[578] Wakida, F.T. August 22, 2008, *Sources of Nitrate in Urban Groundwater.* SciTopics: Research Summaries by Experts. Available at: http://www.scitopics.com/Sources_of_nitrate_in_urban_groundwater.html. Accessed September 20, 2009.
[579] Planert, M., and J.S. Williams, No date, *Ground Water Atlas of the United States – Segment 1 California Nevada: Coastal Basins Aquifer North San Francisco Bay Area Valleys Ground-Water Quality,* Hydrologic Investigations Atlas 730-B. http://ca.water.usgs.gov/groundwater/gwatlas/coastal/quality2.html. Accessed September 20, 2009.
[580] Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project Initial Shoreline Assessment*, prepared for Lennar Urban, February, 2009, op. cit.

Cumulative Impacts

The Project's potential contribution to cumulative hydrology and water quality impacts are also evaluated in the context of past, present, and reasonably foreseeable future development expected to occur in the Project vicinity.

Construction Impacts

Impact HY–1: Water Quality Standards and Waste Discharge Requirements

Impact of Candlestick Point

This discussion addresses whether the Project could result in a violation of either water quality standards or waste discharge requirements. As previously mentioned, the CWA requires each state to adopt water quality standards for receiving water bodies and to have those standards approved by the USEPA. Water quality standards consist of designated beneficial uses for a particular receiving water body (e.g. wildlife habitat, agricultural supply, fishing etc.), along with water quality objectives necessary to support those uses. Discharges from the combined sewer system are regulated under two individual National Pollutant Discharge Elimination System (NPDES) permits issued by the SFRWQCB that identify specific waste discharge requirements (WDRs). The SFRWQCB incorporates conditions into WDRs to be protective of water quality and comply with water quality standards.[581] In some places in this section, the WDRs contained in the NPDES permits issued by the SFRWQCB are also referred to as Waste Discharge Permits.

In addition, a key policy of California's water quality program is the State's Antidegradation Policy. This policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California (SWRCB Resolution No. 68-16), restricts degradation of surface and ground waters. In particular, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses. Under the Antidegradation Policy, any actions that can adversely affect water quality in all surface and ground waters must: (1) be consistent with maximum benefit to the people of the State; (2) not unreasonably affect present and anticipated beneficial use of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies, (i.e., will not result in exceedances of water quality objectives).[582]

Impact HY–1a **Construction at Candlestick Point would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements. (Less than Significant with Mitigation)** ***[Criterion M.a]***

The discharge of sediment-laden runoff, groundwater from temporary construction dewatering activities, the incidental or accidental release of construction materials or products into the combined sewer system, separate storm sewer systems, or directly to receiving waters within or adjacent to the Project site, or the exposure of surface water or groundwater to contaminated soils could impair water quality.

[581] California Regional Water Quality Control Board San Francisco Bay Region, 2008, Order No. R2-2008-007 and NPDES No. CA0037664.
[582] SWRCB, 1968, Statement of Policy with Respect to Maintaining High Quality of Waters in California. Resolution No. 68-16.

Construction activities within Candlestick Point would include demolition of existing facilities, the clearing and grading of development areas (including excavation, trenching, movement of soil, and the importation of fill soils), and the subsequent construction of new facilities and associated infrastructure. Construction activities would expose soils to rainfall and runoff, construction vehicle traffic, and wind, which could result in the erosion of soils and the mobilization and deposition of dust from disturbed development areas.

Construction activities could also result in the incidental release of construction materials or the accidental spill of substances commonly used in construction (e.g., paints, solvents, petroleum products, equipment leakage, and others). The incidental release or accidental spill of such substances could result in the introduction of those substances directly to the Lower Bay, or into stormwater runoff that would subsequently discharge into the combined or separate sewer system.

Construction activities could also disturb contaminated soils and increase their exposure to surface water runoff and cause or contribute to surface water or groundwater quality degradation. Historic land uses within Candlestick Point may have resulted in the contamination of soil or groundwater by hazardous materials. Although the potential for residual hazardous materials to occur at Candlestick Point is not high, portions of Candlestick Point (bayward from the high tide mark) are primarily fill material and could, therefore, contain a variety of contaminants; in addition, unknown contamination may also be present. The potential for such contamination to be encountered during construction is addressed in Section III.K. Mitigation measures MM HZ-1a (Article 22 Site Mitigation Plan), MM HZ-2a.1 (Unknown Contaminant Contingency Plan), MM HZ-15 (Asbestos Dust Control Plan) would reduce the potential for hazardous materials that may be present in soils to be mobilized as pollutants in stormwater runoff as a result of construction activities.

Construction of the Project would require excavation of portions of the site for building foundations, basements, utilities, or mechanical equipment that may be installed below grade. Excavation and grading could encounter groundwater, which has generally been found at locations between 10 and 15 feet below the ground surface. Historically, depths to groundwater have been measured at depths as shallow as three feet in the lowland areas, and as deep as 30 feet bgs in the upland areas.[583] The installation of below-grade building elements could, therefore, require temporary dewatering and the short-term discharge of groundwater to either the combined sewer system or separate storm sewer systems.

As previously discussed, portions of Candlestick Point drain to the combined sewer system, while other portions discharge directly to the Lower Bay or drain to separate sewer systems that then drain to the Lower Bay. Construction activities could result in construction-related discharges to the combined sewer system, separate sewer systems, sheet flow to the Lower Bay, or direct discharges to surface waters. The combined sewer system collects and treats stormwater flows prior to discharge to the Lower Bay; however, there is currently no treatment of stormwater runoff that drains to the Lower Bay via direct discharges or separate sewer systems.

[583] PRC, et al., *Parcel E Remediation Investigation Draft Report, Hunters Point Shipyard, San Francisco, CA*, 1997, Part of Comprehensive Long Term Environmental Action Navy (Clean II).

Combined Sewer System

Erosion and Sediment Control

Construction-related discharges to the combined system would be subject to the City's Construction Site Runoff Pollution Prevention Program requirements that are described in the City's Construction Site Water Pollution Prevention Program. The City's Construction Site Runoff Pollution Prevention Procedures were established to ensure that all businesses comply with all appropriate stormwater laws and other City requirements, and includes inspection of construction sites to ensure compliance. Under this program, all construction sites must prepare a SWPPP, which includes an ESCP. The SWPPP must be submitted to the City and include BMPs that prevent illicit discharge into the combined sewer system. The City conducts periodic inspections to ensure compliance with the SWPPP, thereby reducing the potential for pollutants in stormwater runoff to enter the combined sewer system and cause or contribute to violation of the SWPCP Wastewater Discharge Permit. The SWPPP is a design-phase document that would depend on site specific conditions, final grading plans, staging areas, topography, and other conditions. As such, preparation of an SWPPP allows for discretionary selection of many BMPs and plan elements by the Project Applicant.

The construction BMPs contained in the SWPPP shall be implemented to prevent transport of sediment and residual contaminants to the combined sewer system or Lower Bay. Perimeter protection would minimize transport of sediment off-site or into the combined sewer system. Materials and waste handling BMPs prevent spills, contact of rainwater with pollutants, and provide for quick and effective clean up in the event of a spill. These BMPs would reduce the potential for sediment and pollutants to enter the combined sewer system in a manner that would exceed water quality standards or cause or contribute to a violation of the applicable WDRs.

To reduce construction-related pollutants in stormwater runoff, the following mitigation measure shall be implemented:

MM HY-1a.1 *Storm Water Pollution Prevention Plan: Combined Storm Sewer System. In compliance with the Article 4.1 of the Public Works Code and the City's Construction Site Water Pollution Prevention Program, the Project Applicant shall submit a site-specific Storm Water Pollution Prevention Plan (SWPPP) to the SFPUC for approval, prior to initiating construction activities in areas draining to the combined sewer system. The SFPUC requires implementation of appropriate Best Management Practices (BMPs) from the California Stormwater Quality Association Stormwater BMP Handbook-Construction[584] or the Caltrans Construction Site BMPs Manual.585 In accordance with SFPUC's requirements, the SWPPP shall include:*

- *An Erosion and Sediment Control Plan that includes a site map illustrating the BMPs that will be used to minimize on-site erosion and the sediment discharge into the combined sewer system, and a narrative description of those BMPs. Appropriate BMPs for Erosion and Sediment Control Plan may include:*
  - *Scheduling—Develop a schedule that includes sequencing of construction activities with the implementation of appropriate BMPs. Perform construction activities and control practices in*

[584] California Stormwater Quality Association, 2003, *Stormwater BMP Handbook- Construction*, January 2003 with revisions through 2004.
[585] Caltrans, 2003, *Caltrans Stormwater Quality Handbook Construction Site Best Management Practices Manual*, March 1, 2003.

accordance with the planned schedule. Schedule work to minimize soil-disturbing activities during the rainy season. Schedule major grading operations for the dry season when practical. Monitor the weather forecast for rainfall and adjust the schedule as appropriate.

- > *Erosion Control BMPs—Preserve existing vegetation where feasible, apply mulch or hydroseed areas with native, non-invasive species, until permanent stabilization is established, and use soil binders, geotextiles and mats, earth dikes and drainage swales, velocity dissipation devices, slope drains, or polyacrylamide to protect soil from erosion.*
- > *Wind Erosion BMPs—Apply water or other dust palliatives to prevent dust nuisance; prevent overwatering which can cause erosion. Alternatively, cover small stockpiles or areas that remain inactive for seven or more days.*
- > *Sediment Control BMPs—Install silt fences, sediment basins, sediment traps, check dams, fiber rolls, sand or gravel bag barriers, straw bale barriers, approved chemical treatment, and storm drain inlet protection to minimize the discharge of sediment. Employ street sweeping to remove sediment from streets.*
- > *Tracking Controls—Stabilize the construction site entrance to prevent tracking of sediment onto public roads by construction vehicles. Stabilize on-site vehicle transportation routes immediately after grading to prevent erosion and control dust. Install a tire wash area to remove sediment from tires and under carriages.*

- *Non-Stormwater Management BMPs that may include water conservation practices; dewatering practices that minimize sediment discharges; and BMPs for: paving and grinding activities; identifying illicit connections and illegal dumping; irrigation and other planned or unplanned discharges of potable water; vehicle and equipment cleaning, fueling, and maintenance; concrete curing and finishing; temporary batch plants; implementing shoreline improvements and working over water. Discharges from dewatering activities shall comply with the SFPUC's Batch Wastewater Discharge Requirements that regulate influent concentrations for various constituents.*
- *Waste Management BMPs shall be implemented for material delivery, use, and storage; stockpile management; spill prevention and control; solid and liquid waste management; hazardous waste management; contaminated soil management; concrete waste management; and septic/sanitary waste management.*
- *SWPPP Training Requirements—Construction personnel will receive training on the SWPPP and BMP implementation.*
- *Site Inspections and BMP Maintenance—An inspector identified in the SWPPP will inspect the site on a regular basis, before and after a storm event, and once each 24-hour period during extended storms to identify BMP effectiveness and implement corrective actions if required. The SWPPP shall include checklists that document when the inspections occurred, the results of the inspection, required corrective measures, and when corrective measures were implemented. Required BMP maintenance related to a storm event shall be completed within 48 hours of the storm event.*

Groundwater Dewatering

For construction activities that discharge to the combined system, discharge of groundwater from temporary construction dewatering activities would be regulated under Article 4.1 of the *San Francisco Public Works Code*, which prohibits the discharge of hazardous waste and other pollutants that violate the City's federal and state NPDES permits. As previously mentioned, these NPDES Permits establish the waste discharge requirements for the combined sewer system.

Pursuant to Article 4.1 of the *San Francisco Public Works Code*, discharges of dewatering water to the combined sewer system would also be regulated under a Batch Wastewater Discharge permit that would be requested by the Applicant and issued by the SFPUC. Specific permit terms and conditions are imposed by the SFPUC to maintain SFPUC's compliance with its own Wastewater Discharge Permit issued by the SFRWQCB. Under the Batch Wastewater Discharge permit, the discharge must meet specific numeric effluent limitations for toxic and conventional pollutants and monitoring is required to ensure compliance.[586]

Summary (Combined Sewer System)

With respect to erosion and sediment control, implementation of mitigation measures MM HY-1a.1 (Stormwater Pollution Prevention Plan and Erosion and Sediment Control Plan), MM HZ-1a (Article 22 Site Mitigation Plan), and MM HZ-2a.1 (Unknown Contaminant Contingency Plan) would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the combined sewer system. Compliance with Article 4.1, including regulation under SFPUC's Batch Wastewater Discharge permit, would reduce the potential for pollutant discharges caused by groundwater dewatering to enter the combined sewer system. Water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Separate Storm Sewer System

Erosion and Sediment Control

In areas that drain to a separate storm sewer system, construction runoff would not be treated in the sanitary sewer system. In these areas, or in areas that discharge runoff directly to the Bay (such as sheet flow from the CPSRA), the Project Applicant would be required to comply with the state's Construction General Permit, including development, implementation, and submittal of a SWPPP (which is required by mitigation measure MM HY-1a.2) that includes minimum BMP requirements, depending upon the Risk Level determination in accordance with the Construction General Permit.

The Construction General Permit specifies a risk-based permitting approach based on the potential for the project to cause or contribute to sedimentation of the receiving water (in this case, the Lower Bay), as well as the sensitivity of the receiving water to sedimentation. It contains numeric action levels (moderate risk, Risk Level 2) and effluent limitations (high risk, Risk Level 3) for pH and turbidity. The Construction General Permit also requires effluent and receiving water (only for some Risk Level 3 sites) monitoring to demonstrate compliance with permit requirements, and corrective action must be taken if these limitations are exceeded or visual observations indicate the presence of pollutants. The results of the monitoring and corrective actions must be reported annually to the SWRCB.

The Construction General Permit requires that the Project Applicant file Permit Registration Documents prior to beginning of construction activities. These documents include a NOI, risk assessment, site map, a SWPPP, annual fee, and signed certification statement. The SWPPP must include measures to ensure that all pollutants and their sources are controlled; non-stormwater discharges are identified and either eliminated, controlled, or treated; site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges; and BMPs installed to

[586] San Francisco Public Utilities Commission, 2008, Requirements for Batch Wastewater Discharges and associated Appendixes, July 10, 2008.

reduce or eliminate pollutants after construction are completed and maintained. The SWPPP must demonstrate that calculations and design details, as well as BMP controls for site run-on, are complete and correct. The Construction General Permit also includes specific minimum BMPs required for stormwater control, based on the risk level determined for the Project site.

The Construction General Permit specifies minimum qualifications for the Qualified SWPPP Developer and Qualified SWPPP Practitioner to ensure that: (1) an appropriate SWPPP is developed; (2) BMPs are correctly installed and inspected; and (3) monitoring and reporting is correctly conducted.

Because the Project site does not discharge to a sediment-sensitive water body, which is defined as a sediment impaired water body or a water body with a beneficial use of cold freshwater habitat, fish spawning, and fish migration, the Project would likely be determined to be either a Risk Level 1 (low) or 2 (moderate) project, depending upon the Project site erosion potential. Therefore, construction in the separate storm sewer system areas would have to implement and incorporate at least Risk Level 1 or 2 minimum requirements into the SWPPP.

Compliance with the requirements of the Construction General Permit would serve to reduce pollutants in construction stormwater runoff from Candlestick Point to the separate storm sewer system and sheet flow to the Lower Bay. While the Construction General Permit contains specific minimum required BMPs, additional, discretionary BMPs could also be identified. Additionally, the SWPPP is an adaptive management tool; the SWPPP must be updated as additional considerations arise and if additional BMPs are required to comply with discharge requirements. The following mitigation measure shall be implemented to reduce construction-related pollutants in stormwater runoff:

MM HY-1a.2 *<u>Stormwater Pollution Prevention Plan: Separate Storm Sewer System.</u> Consistent with the requirements of the SWRCB General Permit for Storm Water Discharges Associated with Construction and Land Disturbing Activities (Construction General Permit), the Project Applicant shall undertake the proposed Project in accordance with a project-specific Storm Water Pollution Prevention Plan (SWPPP) prepared by Qualified SWPPP Developer, who shall consult with California State Parks on those elements of the SWPPP that cover the Candlestick Park State Recreation Area, including selection of best management practices and other SWPPP improvements. The SFRWQCB, the primary agency responsible for protecting water quality within the project area, is responsible for reviewing and ensuring compliance with the SWPPP. This review is based on the Construction General Permit issued by the SWRCB.*

The SWPPP shall include, as applicable, all Best Management Practices (BMPs) required in Attachment C of the Construction General Permit for Risk Level 1 dischargers, Attachment D for Risk Level 2 dischargers, or Attachment E for Risk Level 3 dischargers. In addition, recommended BMPs, subject to review and approval by the SFRWQCB, include the measures listed below. However, the measures themselves may be altered, supplemented, or deleted during the SFRWQCB's review process, since the SFRWQCB has final authority over the terms of the SWPPP.

- *Scheduling:*
  - *To reduce the potential for erosion and sediment discharge, schedule construction to minimize ground disturbance during the rainy season. Schedule major grading operations during the dry season when practical, and allow enough time before rainfall begins to stabilize the soil with vegetation or to install sediment-trapping devices.*
  - *Sequence construction activities to minimize the amount of time that soils remain disturbed.*

- *Stabilize all disturbed soils as soon as possible following the completion of ground disturbing work.*
- *Install erosion and sediment control BMPs prior to the start of any ground-disturbing activities.*

■ *Erosion and Sedimentation:*

- *Preserve existing vegetation in areas where no construction activity is planned or where construction activity will occur at a later date.*
- *Stabilize and re-vegetate disturbed areas as soon as possible after construction with planting, seeding, and/or mulch (e.g., straw or hay, erosion control blankets, hydromulch, or other similar material) except in actively cultivated areas. Planting and seeding shall use native, non-invasive species.*
- *Install silt fences, coir rolls, and other suitable measures around the perimeter of the areas affected by construction and staging areas and around riparian buffers, storm drains, temporary stockpiles, spoil areas, stream channels, swales, down-slope of all exposed soil areas, and in other locations determined necessary to prevent off-site sedimentation.*
- *Install temporary slope breakers during the rainy season on slopes greater than 5 percent where the base of the slope is less than 50 feet from a water body, wetland, or road crossing at spacing intervals required by the SFRWQCB.*
- *Use filter fabric or other appropriate measures to prevent sediment from entering storm drain inlets.*
- *Detain and treat stormwater using sedimentation basins, sediment traps, baker tanks, or other measures to ensure that discharges to receiving waters meet applicable water quality objectives.*
- *Install check dams, where applicable, to reduce flow velocities. Check dams reduce erosion and allow sediment to settle out of runoff.*
- *Install outlet protection/energy dissipation, where applicable, to prevent scour of the soil caused by concentrated high velocity flows.*
- *Implement control measures such as spraying water or other dust palliatives to alleviate nuisance caused by dust.*

■ *Groundwater/Dewatering:*

- *Prepare a dewatering plan prior to excavation specifying methods of water collection, transport, treatment, and discharge of all water produced by construction site dewatering.*
- *Impound water produced by dewatering in sediment retention basins or other holding facilities to settle the solids and provide other treatment as necessary prior to discharge to receiving waters. Locate sedimentation basins and other retention and treatment facilities away from waterways to prevent sediment-laden water from reaching streams.*
- *Control discharges of water produced by dewatering to prevent erosion.*
- *If contaminated groundwater is encountered, contact the SFRWQCB for appropriate disposal options. Depending on the constituents of concern, such discharges may be disallowed altogether, or require regulation under a separate general or individual permit that would impose appropriate treatment requirements prior to discharge to the stormwater drainage system.*

- *Tracking Controls:*
  - *Grade and stabilize construction site entrances and exits to prevent runoff from the site and to prevent erosion.*
  - *Install a tire washing facility at the site access to allow for tire washing when vehicles exit the site.*
  - *Remove any soil or sediment tracked off paved roads during construction by street sweeping.*
- *Non-stormwater Controls:*
  - *Place drip pans under construction vehicles and all parked equipment.*
  - *Check construction equipment for leaks regularly.*
  - *Wash construction equipment in a designated enclosed area regularly.*
  - *Contain vehicle and equipment wash water for percolation or evaporative drying away from storm drain inlets.*
  - *Refuel vehicles and equipment away from receiving waters and storm drain inlets, contain the area to prevent run-on and run-off, and promptly cleanup spills.*
  - *Cover all storm drain inlets when paving or applying seals or similar materials to prevent the discharge of these materials.*
- *Waste Management and Hazardous Materials Pollution Control:*
  - *Remove trash and construction debris from the project area daily.*
  - *Locate sanitary facilities a minimum of 300 feet from receiving waters. Maintain sanitary facilities regularly.*
  - *Store all hazardous materials in an area protected from rainfall and stormwater run-on and prevent the off-site discharge of hazardous materials.*
  - *Minimize the potential for contamination of receiving waters by maintaining spill containment and cleanup equipment on site, and by properly labeling and disposing of hazardous wastes.*
  - *Locate waste collection areas close to construction entrances and away from roadways, storm drains, and receiving waters.*
  - *Inspect dumpsters and other waste and debris containers regularly for leaks and remove and properly dispose of any hazardous materials and liquid wastes placed in these containers.*
  - *Train construction personnel in proper material delivery, handling, storage, cleanup, and disposal procedures.*
  - *Implement construction materials management BMPs for:*
    - *Road paving, surfacing and asphalt removal activities.*
    - *Handling and disposal of concrete and cement.*
- *BMP Inspection, Maintenance, and Repair:*
  - *Inspect all BMPs on a regular basis to confirm proper installation and function. Inspect BMPs daily during storms.*
  - *Immediately repair or replace BMPs that have failed. Provide sufficient devices and materials (e.g., silt fence, coir rolls, erosion blankets, etc.) throughout project construction to enable immediate corrective action for failed BMPs.*

- *Monitoring and Reporting:*
  - > *Provide the required documentation for SWPPP inspections, maintenance, and repair requirements. Personnel that will perform monitoring and inspection activities shall be identified in the SWPPP.*
  - > *Maintain written records of inspections, spills, BMP-related maintenance activities, corrective actions, and visual observations of off-site discharges of sediment or other pollutants, as required by the SFRWQCB.*
  - > *Monitor the water quality of discharges from the site to assess the effectiveness of control measures.*
- *Implement Shoreline Improvements and work over water BMPs to minimize the potential transport of sediment, debris, and construction materials to the Lower Bay during construction of shoreline improvements.*
- *Post-construction BMPs:*
  - > *Re-vegetate all temporarily disturbed areas as required after construction activities are completed. Re-vegetation shall use native, non-invasive species.*
  - > *Remove any remaining construction debris and trash from the project site and area upon project completion.*
  - > *Phase the removal of temporary BMPs as necessary to ensure stabilization of the site.*
  - > *Maintain post-construction site conditions to avoid formation of unintended drainage channels, erosion, or areas of sedimentation.*
  - > *Correct post-construction site conditions as necessary to comply with the SWPPP and any other pertinent SFRWQCB requirements.*
- *Train construction site personnel on components of the SWPPP and BMP implementation. Train personnel that will perform inspection and monitoring activities.*

Groundwater Dewatering

For construction activities that discharge to the separate storm sewer system, discharge of groundwater from temporary construction dewatering activities would be regulated by the SFRWQCB by one of several mechanisms, depending on the quality and quantity of groundwater and its potential to cause or contribute to violation of water quality standards. The permitting options are coverage under (1) the Construction General Permit; (2) one of the three General NPDES Permits regulating the discharge of extracted and treated groundwater to the storm drain system; or (3) an individual NPDES permit/WDR.[587] These permits include provisions for discharge limitations, peak flow and flow duration restrictions, other dewatering discharge requirements, and monitoring and reporting requirements.

Because permit conditions will depend upon the quality of the water discharged and the anticipated discharge rates, mitigation measure MM HY-1a.3 will require the preparation and implementation of a Groundwater Dewatering Plan to protect water quality, which shall be incorporated into the SWPPP:

[587] An NPDES permit also serves as a WDR.

MM HY-1a.3 *Groundwater Dewatering Plan. Prior to commencement of construction activities and to minimize potential impacts to receiving water quality during the construction period, the Project Applicant shall through the proper implementation of this dewatering plan, show compliance with SFRWQCB/NPDES requirements, whichever are applicable.*

The Dewatering Plan shall specify how the water would be collected, contained, treated, monitored, and/or discharged to the vicinity drainage system or Lower Bay. Subject to the review and approval of the SFRWQCB, the Dewatering Plan shall include, at a minimum:

- *Identification of methods for collecting and handling water on site for treatment prior to discharge, including locations and capacity of settling basins, infiltration basins (where not restricted by site conditions), treatment ponds, and/or holding tanks*
- *Identification of methods for treating water on site prior to discharge, such as filtration, coagulation, sedimentation settlement areas, oil skimmers, pH adjustment, and other BMPs*
- *Procedures and methods for maintaining and monitoring dewatering operations to ensure that no breach in the process occurs that could result in an exceedance of applicable water quality objectives*
- *Identification of discharge locations and inclusion of details on how the discharge would be conducted to minimize erosion and scour*
- *Identification of maximum discharge rates to prevent exceedance of storm drain system capacities*
- *Additional requirements of the applicable General Permit or NPDES Permit/WDR (including effluent and discharge limitations and reporting and monitoring requirements, as applicable) shall be incorporated into the Dewatering Plan*

Any exceedance of established narrative or numeric water quality objectives shall be reported to the SFRWQCB and corrective action taken as required by the SFRWQCB and the Dewatering Plan. Corrective action may include increased residence time in treatment features (e.g., longer holding time in settling basins) and/or incorporation of additional treatment measures (e.g., addition of sand filtration prior to discharge).

Groundwater dewatering activities could also alter the gradient of groundwater flow. However, the altered groundwater flow gradient would not be expected to cause or contribute to discharge of contaminated groundwater to the Lower Bay; groundwater would flow towards the point(s) of dewatering (internal to the site) and not towards the Lower Bay. In addition, refer to Impact HZ-5b and mitigation measure MM HZ-5a (Foundation Support Piles Installation Plan) in Section III.K for a discussion of foundation support piles installation, including the potential for groundwater contamination.

Summary (Separate Storm Sewer System)

With respect to erosion and sediment control, implementation of mitigation measures MM HY-1a.2 (SWPPP-Separate Storm Sewer System), MM HZ-1a (Article 22 Site Mitigation Plan), MM HZ-2a.1 (Unknown Contaminant Contingency Plan), MM-HZ-5a (Foundation Support Piles Installation Plan) and MM HZ-15 (Asbestos Dust Mitigation and Control Plan) would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the separate sewer system. Compliance mitigation measure MM HY-1a.3 would require the preparation and implementation of a Groundwater Dewatering Plan to protect water quality. Water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Shoreline Activities

Development at Candlestick Point would include the repair and upgrade of existing shoreline protection features (e.g., riprap) along the majority of the shoreline (as further described and illustrated in Chapter II). Improvements to the shoreline along Candlestick Point would include the placement of additional riprap (rock) to improve the flood protection function of the existing riprap shoreline edge, the creation of a sandy recreational beach at the mid-point of the Wind Meadow reach along the Eastern Shoreline; and the creation of new tidal habitat in several locations. This would involve construction activities along the shoreline that could result in the discharge of pollutants in stormwater runoff and/or the incidental or accidental discharge of substances and materials commonly used in construction directly to the Lower Bay.

Construction activities along the shore would expose soils to rainfall, runoff, wind, and wave action, which could result in the erosion of soils, the mobilization and deposition of dust from affected areas, and the mobilization and transport of residual hazardous materials in soils to the Lower Bay. These activities could contribute construction debris and materials directly to surface waters, cause suspension of particulates, or cause re-suspension of toxic sediment-bound pollutants into the water column. The specific construction methods for in-water construction would be determined during detailed Project design, and the agencies that would provide oversight would be determined during the permit application review process.

Various permits would be likely be required to construction the Project, such as a CWA Section 404 Permit and associated CWA section 401 Water Quality Certification, a Section 10 of the *Rivers and Harbors Act* Permit, and/or a permit issued by BCDC under the *McAteer-Petris Act*. For example, in order for a Project Applicant to discharge dredged material to any water of the US, including navigable waters, Section 404 of the CWA requires an evaluation to demonstrate that there is no practicable alternative to the proposed discharge that would have less impact on the aquatic ecosystem. Most RWQCBs rely on applications for a CWA 401 Water Quality Certification (or a waiver thereof) to determine whether WDRs need to be issued for a project. Refer to Section III.N for a detailed discussion of the potential impacts to biological resources resulting from in-water construction, the permitting processes that would likely be required, and the mitigation measures that have been identified in this EIR to address biological impacts at Candlestick Point (e.g., Impact BI-4a and mitigation measures MM BI-4a.1 and MM BI-4a.2; and Impact BI-12a). Specifically, mitigation measures MM BI-4a.1 and MM BI-4a.2 provide measures to protect biological resources during construction of the shoreline improvements and also include BMPs to reduce potential effects on water quality.

It is anticipated that any permit(s) issued could include or otherwise reference the construction-related BMPs identified by the Project Applicant in the SWPPPs to reduce potential impacts to water quality (refer to mitigation measures MM HY-1a.1 and HY-1a.2). Further, additional BMPs may be specified by the agencies to further protect water quality along the shoreline. For example, typical BCDC permit conditions include requirements to construct, guarantee, and maintain public access to the Bay, specified construction methods to ensure safety or to protect water quality, plan review requirements that must be met before construction can begin, and mitigation requirements to offset adverse environmental impacts.

With respect to water quality impacts caused by the shoreline improvements at Candlestick Point, including pollutants transported through erosion and sedimentation, the incidental release of construction materials, or the accidental spill of substances commonly used in construction directly to the Lower Bay, implementation of mitigation measures MM HY-1a.1 (SWPPP and ESCP – Combined Sewer System),

MM HY-1a.2 (SWPPP – Separate Storm Sewer System), MM HZ-1a (Article 22 Site Mitigation Plan), and MM HZ-2a.1 (Unknown Contaminant Contingency Plan) would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the Lower Bay. While mitigation measures MM HY-1a.1 and MM HY-1a.2, each of which require the preparation of a SWPPP, are intended to address runoff that enters either the combined or separate sewer systems, the BMPs could also address shoreline improvement activities.

Summary of Impact at Candlestick Point

These mitigation measures, which shall be implemented by the Project Applicant, would ensure that water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Impact of Hunters Point Shipyard Phase II

Impact HY-1b **Construction at HPS Phase II would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements. (Less than Significant with Mitigation) *[Criterion M.a]***

The discharge of sediment-laden runoff, groundwater from temporary construction dewatering activities, the incidental or accidental release of construction materials or products into the combined sewer system, separate storm sewer systems, or directly to receiving waters within or adjacent to the Project site, or the exposure of surface water or groundwater to contaminated soils could impair water quality.

Construction activities within HPS Phase II would include demolition of existing facilities, the clearing and grading of development areas (including excavation, trenching, movement of soil, and the importation of fill soils), and the subsequent construction of new facilities and associated infrastructure. Construction activities would expose soils to rainfall and runoff, construction vehicle traffic, and wind, which could result in the erosion of soils and the mobilization and deposition of dust from disturbed development areas.

Construction activities could also result in the incidental release of construction materials or the accidental spill of substances commonly used in construction (e.g., paints, solvents, petroleum products, equipment leakage, and others). The incidental release or accidental spill of such substances could result in the introduction of those substances directly to the Lower Bay or into stormwater runoff, and their subsequent discharge to the separate sewer system.

Construction activities could also disturb contaminated soils and increase their exposure to surface water runoff and cause or contribute to surface water or groundwater quality degradation. The historic uses at HPS Phase II by both the Navy and its tenants resulted in a number of hazardous materials release sites that are presently undergoing remediation by the Navy under federal law and under the supervision of federal and state environmental agencies. The potential for such contamination to be encountered during construction is addressed in Section III.K.

Construction of the Project would require excavation of portions of the site for building foundations, basements, utilities, or mechanical equipment that may be installed below grade. Excavation and grading could encounter groundwater. The installation of below-grade building elements could, therefore, require temporary dewatering and the short-term discharge of groundwater to the separate storm sewer system.

Separate Storm Sewer System

Erosion and Sediment Control

As discussed in Impact HY-1a, in areas that drain to a separate storm sewer system, construction runoff would not be treated in the combined sewer system, which could result in the potential for pollutants in stormwater runoff to discharge to the Bay. In these areas, or in areas that discharge runoff directly to the Bay (such as sheet flow from the CPSRA), the Project Applicant would be required to comply with the state's Construction General Permit, including development, implementation, and submittal of a SWPPP (which is required by mitigation measure MM HY-1a.2 (SWPPP-Separate Storm Sewer System) that includes minimum BMP requirements, depending upon the Risk Level Determination. The discussion provided in Impact HY-1a regarding the regulatory systems in place that address the potential for pollutants to be transported in stormwater to the separate storm sewer system (thereby affecting water quality) would also apply to HPS Phase II.

The historic uses at HPS Phase II by both the Navy and its tenants resulted in a number of hazardous materials release sites that are presently undergoing remediation by the Navy under federal law and under the supervision of federal and state environmental agencies. Prior to the transfer of HPS Phase II property to the City, the Navy must ensure, to the satisfaction of the Federal Facilities Agreement (FFA) signatories, that the Project site is suitable for conveyance for the use intended and that the intended use is consistent with the protection of human health and the environment (refer also to Section III.K for further detail). As discussed in Section III.K, the Navy would be required to implement Institutional Controls (ICs) for cleanup at HPS Phase II. ICs are legal and administrative mechanisms to implement land use restrictions to limit the exposure of future landowners and users to hazardous materials and to ensure the integrity of remedial activities. ICs are required when a property is remediated to cleanup levels that do not allow for unlimited use and unrestricted exposure. As noted in Section III.K., the HPS Phase II site is contaminated by past use and would likely continue to retain residual hazardous material contamination after transfer of the site from the Navy to San Francisco Redevelopment Agency and the Project Applicant.

During construction, stormwater runoff over disturbed, contaminated soils could transport contaminated sediment to surface water or mobilize residual pollutants and transport them to surface waters. Additionally, infiltration of rainfall through disturbed areas, including disturbance of interim or permanent caps and covers, could alter the local groundwater gradient and cause or contribute to migration of groundwater pollutants to the Lower Bay. However, when determined necessary by Article 22A of the Health Code, mitigation measures MM HZ-1a (Article 22 Site Mitigation Plan) would require a Site Mitigation Plan and MM HZ-2a.1 (Unknown Contaminant Contingency Plan) would require a contingency plan to address the discovery of unknown contaminated areas. Implementation of mitigation measure MM HY-1a.2 (SWPPP-Separate Storm Sewer System) would require the identification of BMPs to protect water quality during construction activities. Implementation of mitigation measure MM HZ-12 (Compliance with Administrative Order of Consent at Early Transferred Parcels) would require compliance by the Agency or Project Applicant with all requirements incorporated into remedial design documents, dust control plans, and any other document required under the Administrative Order of Consent. Implementation of mitigation measure MM HZ-15 (Asbestos Dust Mitigation and Control Plans) would require implementation of appropriate plans control dust that may contain naturally-occurring asbestos.

Water quality standards would not be exceeded nor would the development at HPS Phase II cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Groundwater Dewatering

For construction activities that discharge to the separate storm sewer system, discharge of groundwater from temporary construction dewatering activities would be regulated by the SFRWQCB by one of several mechanisms, depending on the quality and quantity of groundwater and its potential to cause or contribute to violation of water quality standards. The permitting options are coverage under (1) the Construction General Permit; (2) one of the three General NPDES Permits regulating the discharge of extracted and treated groundwater to the storm drain system; or (3) an individual NPDES permit/WDR.[588] These permits include provisions for discharge limitations, peak flow and flow duration restrictions, other dewatering discharge requirements, and monitoring and reporting requirements.

Because permit conditions will depend upon the quality of the water discharged and the anticipated discharge rates, mitigation measure MM HY-1a.3 will require the preparation and implementation of a Groundwater Dewatering Plan to protect water quality. Compliance mitigation measure MM HY-1a.3 would protect water quality. Water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Shoreline Activities

Development at HPS Phase II would include the repair and upgrade of existing shoreline protection features (e.g., riprap) and the construction of new shoreline protection features along the majority of the shoreline (as further described and illustrated in Chapter II). Along some areas of the HPS Phase II shoreline, piers and wharves have deteriorated due to structure age and lack of maintenance, and near-shore settlement has occurred. Repairs of existing HPS Phase II shoreline structures vary based on type of edge and include repair of piles and deck, concrete crack repairs and rock buttresses along base of the drydocks, removal of upper portion of fill along bulkheads, and rip-rap placement. Several piers and drydocks would be modified by the removal of short section of piers and/or bulkheads (near the shore) to preclude public access, thereby creating opportunities for waterbirds to roost on the retained portions of these structures.

The Shipyard currently includes seven piers and six drydocks along the shoreline (refer to Figure II-2). As part of the base closure and conveyance process described in Chapter I (Introduction), the Navy will remove Piers B and C and timber portions (concrete walls would remain) of Drydocks 5, 6, and 7 prior to conveyance of HPS Phase II to the City and County of San Francisco. Drydocks 2 and 3 and four supporting buildings (Buildings 140, 204, 205, and 207) were previously identified as historic resources eligible for listing in the National Register of Historic Places.[589] Heritage Park is proposed at Drydocks 2 and 3 and would display interpretive elements related to the history of HPS. Drydocks 4, 5, 6 and 7 and the Re-Gunning Pier and crane would remain. Piers 1, 2, and 3 consist of long, narrow concrete piers in

[588] An NPDES permit also serves as a WDR.
[589] City and County of San Francisco and San Francisco Redevelopment Agency, Final Environmental Impact Report for the Reuse of Hunters Point Shipyard, February 8, 2000. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

the southeastern portion of HPS Phase II. These pier structures would remain in place, but portions of the pier would be removed to prevent public access for safety reasons. The Re-gunning Pier would be reconfigured for wildlife habitat uses. Some pier areas would require cleaning and repaving. The North and South Piers would be the sites of the proposed marina.

Construction at HPS Phase II would also involve the installation of a marina and the installation of breakwaters to protect the marina. The 300-slip marina will require the construction of two breakwater sections ranging between 300 and 650 feet in length. To accommodate the proposed marina, breakwaters will be constructed using two 10.7 to 11.3 acres basins. They will be constructed off site using concrete sheet pile supported by batter piles and installed using water-based equipment.

These improvements would involve construction activities along the shoreline that could result in the discharge of pollutants in stormwater runoff and/or the incidental or accidental discharge of substances and materials commonly used in construction directly to the Lower Bay.

The demolition of existing piers or parts of piers could generate dust and debris and mobilize underwater sediments in vicinity of the removed pilings. The construction of new in-water pilings, shoreline abutments, and the breakwater could also mobilize underwater sediments, re-suspend sediment-associated contaminants in the water column, as well as potentially result in the incidental release of construction materials (i.e., sawdust, metal fragments, concrete) or the accidental spill of construction materials (i.e., paints and solvents) or substances commonly used in construction equipment (i.e., petroleum products).

The discussion provided in Impact HY-1a regarding the regulatory systems in place that address in-water construction (thereby affecting water quality) would also apply to HPS Phase II. In addition, refer to Impact HZ-5a and mitigation measure MM HZ-5a in Section III.K for a discussion of installation of foundation support piles, including the potential for groundwater contamination. Refer to Impact HZ-10 and mitigation measures MM HZ-10b (Regulatory Agency Approved Workplans and Permits for Shoreline Improvements), for a discussion of methods to reduce the potential of encountering contaminated sediments while implementing shoreline improvements.

The shoreline improvements at HPS Phase II are more extensive than those proposed for Candlestick Point. With respect to water quality impacts caused by the shoreline improvements at HPS Phase II, including pollutants transported through erosion and sedimentation or the incidental release of construction materials or the accidental spill of substances commonly used in construction directly to the Lower Bay, implementation of mitigation measures MM HY-1a.1 (SWPPP—Combined Sewer System), MM HY-1a.2 (SWPPP—Separate Storm Sewer System), MM HZ-1a (Article 22 Site Mitigation Plan), and MM HZ-2a.1 (Unknown Contaminant Contingency Plan) would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the Lower Bay. While mitigation measures MM HY-1a.1 and MM HY-1a.2, each of which require the preparation of a SWPPP, are intended to address runoff that enters either the combined or separate sewer systems, the BMPs could also address shoreline improvement activities.

Refer to Section III.N for a detailed discussion of the potential impacts to biological resources resulting from in-water construction, the permitting processes that would likely be required, and the mitigation measures that have been identified in this EIR to address biological impacts at HPS Phase II (e.g., Impact BI-4a and mitigation measures MM BI-4a.1 (Wetlands and Jurisdictional/Regulated Waters

Mitigation for Temporary and/or Permanent Impacts) and MM BI-4a.2 (Wetlands and Jurisdictional/Regulated Waters Impact Minimization for Construction-Related Impacts); Impact BI-5b and mitigation measure MM BI-5b.4 (Eelgrass Water Quality BMPs); and Impact BI-12b and mitigation measures MM BI-12b.1 (Essential Fish Habitat Avoidance and Minimization Measures) and MM BI-12b.2 (Deconstruction/Construction Debris Recovery). Each of these mitigation measures provides specific mechanisms to protect biological resources and reduce potential effects on water quality during construction of the shoreline improvements.

Summary of Impact at Hunters Point Shipyard, Phase II

All of the mitigation measures referenced in this discussion would ensure that water quality standards would not be exceeded nor would construction and HPS Phase II cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Impact of Yosemite Slough Bridge

Impact HY-1c **Construction of the Yosemite Slough bridge would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements. (Less than Significant with Mitigation) *[Criterion M.a]***

The Yosemite Slough bridge would involve the installation of pilings in the slough, bridge foundations along either edge of the slough, and the installation of the bridge deck surface, which is proposed to include both paved and turf-covered areas. Installation of the bridge pilings could require the installation of sheet piles on either side of the bridge location to form a barrier on either side of the construction site from which water would be removed, followed by the subsequent installation of the bridge pilings and the bridge deck. The installation of sheet piles that form coffer dams on either side of the bridge, bridge pilings, and the bridge foundations could mobilize underwater sediments and re-suspend sediment-associated contaminants into the water column, and result in the incidental release of construction materials (e.g., sawdust, metal fragments, concrete), or the accidental spill of construction materials (e.g., paints and solvents) or substances commonly used in construction equipment (e.g., petroleum products).

With respect to water quality impacts caused by construction of the Yosemite Slough bridge, including pollutants transported through erosion and sedimentation or the incidental release of construction materials or the accidental spill of substances commonly used in construction directly to the Lower Bay, implementation of mitigation measures MM HY-1a.1 (SWPPP—Combined Sewer System), MM HY-1a.2 (SWPPP—Separate Storm Sewer System), MM HZ-1a (Article 22 Site Mitigation Plan), MM HZ-2a.1 (Unknown Contaminant Contingency Plan), and MM HZ-9 (Navy-Approved Workplans for Construction and Remediation Activities on Navy-Owned Property) would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the Lower Bay. While mitigation measures MM HY-1a.1 and MM HY-1a.2, each of which require the preparation of a SWPPP, are intended to address runoff that enters either the combined or separate sewer systems, the BMPs could also address bridge construction activities. In addition, because the bridge would be constructed using piles driven in dry conditions (behind coffer dams), water quality impacts would be minimized.

Refer to Section III.N for a detailed discussion of the potential impacts to biological resources resulting from in-water construction, the permitting processes that would likely be required, and the mitigation measures that have been identified in this EIR to address biological impacts associated with construction of the Yosemite Slough bridge. Implementation of mitigation measures MM BI-4a.1 (Wetlands and Jurisdictional/Regulated Waters Mitigation for Temporary and/or Permanent Impacts), MM BI-4a.2 (Wetlands and Jurisdictional/Regulated Waters Impact Minimization for Construction-Related Impacts); MM BI-12b.1 (Essential Fish Habitat Avoidance and Minimization Measures) and MM BI-12b.2 (Deconstruction/Construction Debris Recovery) would provide specific mechanisms to protect biological resources and reduce potential effects on water quality during construction of Yosemite Slough bridge.

Summary of Impact at Hunters Point Shipyard, Phase II

All of the mitigation measures referenced in this discussion would ensure that water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Combined Impact of Candlestick Point, Hunters Point Shipyard Phase II, and Yosemite Slough Bridge

Impact HY-1 **Construction activities associated with the Project would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements. (Less than Significant with Mitigation)** ***[Criterion M.a]***

As previously discussed, the discharge of sediment-laden runoff, groundwater from temporary construction dewatering activities, the incidental or accidental release of construction materials or products into the combined sewer system, separate storm sewer systems, or directly to receiving waters within or adjacent to the Project site, or the exposure of surface water or groundwater to contaminated soils could impair water quality.

Construction of the Project would include demolition of existing facilities, the clearing and grading of development areas (including excavation, trenching, movement of soil, and the importation of fill soils), and the subsequent construction of new facilities and associated infrastructure, including the Yosemite Slough bridge, the various shoreline improvements, and the marina and breakwaters. Construction activities would expose soils to rainfall and runoff, construction vehicle traffic, and wind, which could result in the erosion of soils and the mobilization and deposition of sediment from disturbed development areas, including those that may contain contamination. Construction activities could also result in the incidental release of construction materials or the accidental spill of substances commonly used in construction (e.g., paints, solvents, petroleum products, equipment leakage, and others). The incidental release or accidental spill of such substances could result in the introduction of those substances directly to the Lower Bay or into stormwater runoff that could discharge into the combined or separate sewer system.

Construction of the Project would require excavation of portions of the site for building foundations, basements, utilities, or mechanical equipment that may be installed below grade. Excavation and grading could encounter groundwater. The installation of below-grade building elements could, therefore, require temporary dewatering and the short-term discharge of groundwater to either the combined sewer system or separate storm sewer systems.

Erosion and Sediment Control

As previously discussed, portions of Candlestick Point drain to the combined sewer system, while other portions discharge directly to the Lower Bay (via sheet flow) or drain to separate storm sewer systems that then drain to the Lower Bay. HPS Phase II drains to the separate storm sewer system. The combined sewer system collects and treats stormwater flows prior to discharge to the Lower Bay; however, there is currently no treatment of stormwater runoff that drains to the Lower Bay via direct discharges or separate sewer systems.

Construction-related discharges to the combined system would need to comply with Article 4.1 of the *San Francisco Public Works Code* and meet the requirements of the City's Construction Site Runoff Pollution Prevention Program. The City's Construction Site Runoff Pollution Prevention procedures were established to ensure that all businesses comply with all appropriate stormwater laws and other City requirements, and includes inspection of construction sites to ensure compliance. Under this program, all construction sites must prepare a SWPPP, which includes an ESCP, as further required by mitigation measure MM HY-1a.1.

In areas served by a separate storm sewer system, or in areas that discharge runoff directly to the Bay (such as sheet flow from the CPSRA), the Project Applicant would be required to comply with the state's Construction General Permit, including development, implementation, and submittal of a SWPPP (which is required by mitigation measure MM HY-1a.2) that includes minimum BMP requirements, depending upon the Risk Level determination according to the Construction General Permit.

Groundwater Dewatering

For construction activities that discharge to the combined system, discharge of groundwater from temporary construction dewatering activities would be regulated under Article 4.1 of the *San Francisco Public Works Code*, which prohibits the discharge of hazardous waste and other pollutants that violate the City's federal and state NPDES permits. These NPDES Permits establish the waste discharge requirements for the combined sewer system.

Pursuant to Article 4.1 of the *San Francisco Public Works Code*, discharges of dewatering water to the combined sewer system would be regulated under a Batch Wastewater Discharge permit that would be obtained by the Applicant from the SFPUC. Specific permit terms and conditions are imposed by SFPUC to maintain SFPUC's compliance with its own Wastewater Discharge Permit issued by the SFRWQCB. Under the Batch Wastewater Discharge permit, the discharge must meet specific numeric effluent limitations for toxic and conventional pollutants and monitoring is required to ensure compliance. [590]

For construction activities that discharge to the separate storm sewer system, discharge of groundwater from temporary construction dewatering activities would be regulated by the SFRWQCB by one of several mechanisms, depending on the quality and quantity of groundwater and its potential to cause or contribute to violation of water quality standards. The permitting options are coverage under (1) the Construction General Permit (for uncontaminated groundwater); (2) one of the three General NPDES Permits regulating the discharge of extracted and treated groundwater to the storm drain system; or (3) an individual NPDES

[590] San Francisco Public Utilities Commission, 2008, Requirements for Batch Wastewater Discharges and associated Appendixes, July 10, 2008.

permit/WDR.[591] These permits include provisions for discharge limitations, peak flow and flow duration restrictions, other dewatering discharge requirements, and monitoring and reporting requirements.

Because permit conditions will depend upon the quality of the water discharged and the anticipated discharge rates, mitigation measure MM HY-1a.3 will require the preparation and implementation of a Groundwater Dewatering Plan to protect water quality; the Groundwater Dewatering Plan shall be incorporated into the SWPPP. Compliance with mitigation measure MM HY-1a.3 would protect water quality. Water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Shoreline Activities

As further discussed in Impact HY-1a, Impact HY-1b, and Impact HY-1c, development of the Project would include the repair and upgrade of existing shoreline protection features (e.g., riprap) and the construction of new shoreline protection features along the majority of the shoreline (as further described and illustrated in Chapter II).

Summary

With respect to erosion and sediment control, implementation of mitigation measures MM HY-1a.1 (SWPPP - Combined Sewer System), MM HY-1a.2 (SWPPP-Separate Storm Sewer System), MM HZ-1a (Article 22 Site Mitigation Plan), MM HZ-2a.1 (Unknown Contaminant Contingency Plan), MM HZ-9 (Navy-Approved Workplans for Construction and Remediation Activities on Navy-Owned Property), MM HZ-12 (Compliance with Administrative Order of Consent at Early Transferred Parcels), and MM HZ-15 (Asbestos Dust Mitigation and Control Plans)would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the combined or separate sewer system. Compliance with Article 4.1, including regulation under SFPUC's Batch Wastewater Discharge permit, would reduce the potential for pollutant discharges caused by groundwater dewatering to enter the combined sewer system. Implementation of mitigation measure MM HY-1a.3 would reduce the impacts of discharging dewatered groundwater into the separate sewer system. Water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

With respect to water quality impacts caused by the shoreline improvements at Candlestick Point, including pollutants transported through erosion and sedimentation or the incidental release of construction materials or the accidental spill of substances commonly used in construction directly to the Lower Bay, implementation of mitigation measures MM HY-1a.2 (SWPPP and ESCP—Combined Sewer System), MM HY-1a.2 (SWPPP—Separate Storm Sewer System), MM HZ-1a (Article 22 Site Mitigation Plan), MM HZ-2a.1 (Unknown Contaminant Contingency Plan), and MM HZ-10b (Regulatory Agency-Approved Workplans and Permits for Shoreline Improvements) would reduce the potential for contaminants, sediments, or pollutants in stormwater runoff to enter the Lower Bay. While mitigation measures MM HY-1a.1 and MM HY-1a.2, each of which require the preparation of a SWPPP, are intended to address runoff that enters either the combined or separate sewer systems, the BMPs could also address shoreline improvement activities.

[591] An NPDES permit also serves as a WDR.

Refer to Section III.N for a detailed discussion of the potential impacts to biological resources resulting from in-water construction, the permitting processes that would likely be required, and the mitigation measures that have been identified in this EIR to address biological impacts at HPS Phase II, including MM BI-4a.1 (Wetlands and Jurisdictional/Regulated Waters Mitigation for Temporary and/or Permanent Impacts), MM BI-4a.2 (Wetlands and Jurisdictional/Regulated Waters Impact Minimization for Construction-Related Impacts), MM BI-5b.4 (Eelgrass Water Quality BMPs), MM BI-12b.1 (Essential Fish Habitat Avoidance and Minimization Measures) and MM BI-12b.2 (Deconstruction/Construction Debris Recovery). Each of these mitigation measures provides specific mechanisms to protect biological resources and reduce potential effects on water quality during in-water construction activities.

All of the mitigation measures referenced in this discussion would ensure that water quality standards would not be exceeded nor would the Project cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Impact HY-2: Groundwater Supplies and Groundwater Recharge

Impact HY-2 **Construction activities associated with the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (Less than Significant)** ***[Criterion M.b]***

Groundwater would not be used for any construction activities such as dust control or irrigation of vegetated erosion control features; no groundwater wells would be developed as part of the Project and no on-site groundwater wells would be used for water supplies. Short-term construction groundwater dewatering may be necessary at certain locations (e.g., for installation of building foundations or underground utilities), but dewatering would have only a minor temporary effect on the groundwater table elevation in the immediate vicinity of the activity, and would not measurably affect groundwater supplies. Further, the shallow groundwater underlying the Project site at Candlestick point or HPS Phase II is not used for water supply. Construction activities would generally occur within areas that are already developed, and much of the existing open space would remain undeveloped and continue to contribute to groundwater recharge. Construction of the Project would include installation and operation of groundwater remediation and monitoring wells, if required by Navy transfer documents and regulatory requirements (as discussed in Section III.K). Therefore construction at the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge, and this impact would be less than significant. No mitigation is required.

Impact HY-3: Erosion and Siltation Effects

Impact HY-3 **Construction activities associated with the Project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site. (Less than Significant) *[Criterion M.c]***

Construction activities associated with the Project would include site clearance, grading and excavation, and the construction of new buildings and infrastructure. The potential for on-site erosion of exposed soil surfaces during construction activity is fully addressed in Impact HY-1. No streams or rivers exist in the immediate vicinity of the Project site, and thus, no streams or rivers would be altered by construction activity. As discussed in the setting, stormwater at the Project site either drains to storm drains (which include both combined and separate systems), or drains directly to the Bay via surface runoff (generally only along the shoreline). The existing drainage patterns would be generally preserved, although as noted in Chapter II, the ground elevation would be raised (via the importation of fill soils) to protect the area from a potential rise in sea level of up to three feet. This would locally modify drainage patterns within the affected area. Because most of the affected area is already drained by sewer systems (combined and separate), and would continue to drain to a newly constructed entirely separate storm sewer systems, this would not result in a substantial alteration of drainage patterns related to erosion potential. Potential effects of cut and fill activities on slope stability and erosion are addressed in Section III.L. Therefore, construction at the Project site would not substantially alter the existing drainage pattern of the site or area such that on- or off-site erosion is substantially increased and this impact would be less than significant. No mitigation is required.

Impact HY-4: Flooding Effects

Impact HY-4 **Construction activities associated with the Project would not substantially alter the existing drainage pattern of the site, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site. (Less than Significant with Mitigation) *[Criterion M.d]***

No streams or rivers exist within the Project site, and thus, no streams or rivers would be altered by construction activity. The amount of impervious area would not increase; impervious areas would be removed and/or replaced and the Project site would be graded flat (0.1 to 0.5 percent grade), resulting in no increase in stormwater runoff during construction. As discussed under Impact HY-3, construction activities at the Project site would not substantially alter existing drainage patterns causing or contributing to increased stormwater runoff. Construction would include clearance, grading, and excavation, and the subsequent construction of new buildings and infrastructure. With implementation of mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP with BMPs to collect, retain as appropriate, and discharge stormwater runoff), and MM HY-1a.3 (Construction Dewatering Plan), construction of the Project would not substantially alter the existing drainage pattern of the site or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site, and this impact would remain at a less-than-significant level.

Impact HY-5: Storm Sewer System Capacity

Impact HY-5 **Construction activities associated with the Project would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. (Less than Significant with Mitigation) *[Criterion M.e]***

Management of runoff within portions of the Project site affected by construction activity discharging directly to the Bay or to a separate storm drain system would be governed by the conditions of a SWPPP developed per Construction General Permit requirements, as required by mitigation measure MM HY-1a.2, which would include measures to collect, retain, and discharge runoff in ways that do not overwhelm the capacity of existing downstream drainage facilities. Management of runoff from areas draining to the combined sewer system would be governed by conditions of a SWPPP with an ESCP, developed per SFPUC requirements.

As described in Impact HY-1, dewatering to the combined sewer system would require a Batch Wastewater Discharge Permit from the SFPUC. Permit conditions are specified by the SFPUC to prevent violation of the SFPUC's Wastewater Discharge Permit, including conveyance capacity constraints and effluent limits. Dewatering discharges to the separate sewer system would be governed by conditions of the Construction General Permits, other general permits, or an individual NPDES Permit/WDR, as specified by the SFRWQCB.

As discussed in Impacts HY-3 and HY-4, construction of the Project would not be expected to greatly alter Project site drainage such that stormwater runoff is increased. During construction, existing stormwater drainage facilities would be replaced by new, entirely separate sewer systems that would collect and treat Project site stormwater flows. This new storm drain system would be designed and sized in accordance with the City of San Francisco Subdivision Regulations and would also be sized to accommodate 5-year storm event flows from upstream contributing areas (HPS Phase I). In accordance with City design criteria, the newly piped storm drain system would be sized to convey the 5-year storm event when flowing full or surcharged (overloaded/flooded) and runoff from the 5-year storm event up to the 100-year storm event would be contained within the streets and drainage channels rights-of-way.

Impacts associated with additional sources of polluted runoff are addressed in Impact HY-1. As discussed under Impact HY-1, implementation of mitigation measures would reduce potential for construction activities to generate additional sources of polluted runoff to a less-than-significant level.

Operational Impacts

Impact HY-6: Water Quality Standards and Waste Discharge Requirements

Impact of Candlestick Point

This discussion addresses whether the Project could result in a violation of either water quality standards or waste discharge requirements. As previously mentioned, the CWA requires each state to adopt water quality standards which consist of designated beneficial uses and with water quality objectives. Discharges from the combined sewer system are regulated under two NPDES that identify specific WDRs. Stormwater runoff discharges from municipal separate stormwater systems (or MS4s) are regulated under the statewide

Phase II NPDES General Permit for Storm Water Discharges from Small MS4s (Municipal Stormwater General Permit)(Order No. 2003-0005-DWQ), which requires the development of a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent possible (MEP). If recycled water was used for irrigation of landscaping, such use would be subject to the General Waste Discharge Requirements for Landscaping Irrigation Uses of Municipal Recycled Water (Recycled Water General Permit)(Order No. 2009-0006-DWQ). In addition, the State's Antidegradation Policy requires that actions which can adversely affect water quality must: (1) be consistent with maximum benefit to the people of the State; (2) not unreasonably affect present and anticipated beneficial use of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies, (i.e., will not result in exceedances of water quality objectives).

Impact HY-6a Implementation of the Project at Candlestick Point would not contribute to violations of water quality standards or waste discharge requirements. (Less than Significant with Mitigation) *[Criterion M.a]*

Stormwater Runoff

With development of Candlestick Point, stormwater runoff would be treated and conveyed through separate stormwater drainage systems. As such, the applicable WDR would be the Municipal Stormwater General Permit. Development of portions of Candlestick Point would result in the creation or replacement of impervious surfaces that would contribute to stormwater runoff and mobilize pollutants generated by the proposed land uses at Candlestick Point. The Project would remove existing structures, including Alice Griffith Housing, Candlestick Park stadium, and the parking lots surrounding the stadium; approximately 178.5 acres[592] of impervious surfaces. Development at Candlestick Point would include residential, commercial, office, and recreational uses, which could result in approximately 165.4 acres[593] of impervious surfaces. Development at Candlestick Point would, therefore, result in a 7.3 percent reduction in impervious surfaces. This reduction in impervious surface would reduce the volume of stormwater runoff from this area and reduce the surface area where pollutants could be deposited and subsequently transported in stormwater runoff.

Development at Candlestick Point would result in a change in land uses, from residential, a stadium and parking lots, to mixed land uses, including residential, commercial, office, and recreational uses. This change in land uses would affect the types and amounts of pollutants that could be present in stormwater runoff. As discussed above in the Analytic Method, typical stormwater pollutants from mixed land uses may include sediment, nutrients, heavy metals, pathogens, petroleum hydrocarbons, pesticides and other organic compounds, oxygen demanding substances, and trash and debris (refer to Table III.M-2). Stormwater runoff may be a potential source of mercury and PCBs, which are COCs because of the established and pending TMDLs for those substances. Redevelopment of Candlestick Point would remove most of the existing structures and infrastructure which could be historic sources of PCBs, thus reducing any potential discharges. However, the Project operation could be a source of mercury, which could originate from fluorescent light bulbs, mercury-containing instruments, and other sources. As discussed under Impact HY-1a, no known soil contamination is present at Candlestick Point and implementation of

[592] IBI Group, August 21, 2009.
[593] IBI Group, August 21, 2009.

mitigation measures MM HZ-1a (Article 22 Site Mitigation Plan), and MM HZ-2a.1 (Unknown Contaminant Contingency Plan) would ensure remediation of contaminated soils during construction.

Effects of development on water quality were estimated by calculating existing and potential future mean annual pollutant loads. Mean annual pollutant loads are a function of the concentration of pollutants, which is affected by land use, and the volume of runoff from an area, which is affected by the extent of impervious surfaces.

Stormwater pollutant mean annual loads were estimated using the Simple Method, developed based on empirical relationships observed in data collected in the Washington, D.C. area for the Nationwide Urban Runoff Program (NURP) studies published by USEPA in 1983.[594] As no monitoring data is available for runoff from Candlestick Point, pollutant concentrations[595] used in this analysis were derived from a combination of Los Angeles County Department of Public Works (LACDPW) monitoring data and Bay Area Stormwater Management Agencies Association (BASMAA) data; the best available data for the Project area and the proposed land uses. For each parameter, the same data set (either LACDPW or BASMAA) was used for all land use categories for that parameter. Therefore, although the estimated pollutant loads may not be reflective of actual site conditions (as no monitoring data is available), the relative differences resulting from changes in land use should conservatively reflect the change in stormwater quality associated with the proposed development. Refer to Appendix M1 for further description of the methodology and calculations.

The results of this analysis are provided in Table III.M-3 (Estimated Change in Annual Pollutant Loads from Candlestick Point Without BMPs[596]), which quantifies the change in annual pollutant loads[597] compared to existing conditions. Table III.M-3 also shows the change in the mean annual stormwater runoff volume associated with the Project (in acre-feet). To provide a conservative analysis, stormwater BMPs were not included in the analysis because specific details of the stormwater treatment BMPs that would be implemented with development have yet to be identified.

As shown in Table III.M-3, except for ammonia and total kjeldahl nitrogen (which show no change in loadings), development of Candlestick Point would result in a reduction in annual stormwater pollutant loads of between 8 and 67 percent, although these estimated loads do not account for the effect of any treatment measures, for either the existing condition (as some flows are currently discharged the combined system and treated at the SWPCP) or future conditions (as all flows up to the design storm would be treated via on-site BMPs). Table III.M-3 also shows that development of Candlestick Point would reduce stormwater runoff volumes by 37 percent, not accounting for volume reductions by BMPs.

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[594] Center for Watershed Protection. No Date. The Simple Method to Calculate Urban Stormwater Loads. http://www.stormwatercenter.net/monitoring%20and%20assessment/simple%20meth/simple.htm (accessed September 26, 2009).

[595] The concentration of a pollutant is measured in terms of mass per volume (e.g., mg/L).

[596] The data presented in Table III.M-3 is based on estimated site runoff, land use categories, and existing literature values, as described in Appendix M1, Stormwater Runoff Calculations. While literature values cannot be used to identify specific effects or concentrations, they are reasonable for identifying relative changes resulting from changes in land use and runoff.

[597] Pollutant loads are the amount of pollutants entering a water body, generally expressed in terms of mass released over a given time frame (e.g., pounds/day).

Table III.M-3 Estimated Change in Annual Pollutant Loads from Candlestick Point Without BMPs

	Existing			*Project*		
					Difference (Existing – Project)[a]	
Pollutant	*Combined (lbs)*	*Separate (lbs)*	*Total (lbs)*	*Total (lbs)*	*(lbs)*	*(%)*
Total Suspended Solids	24,951	42,289	67,240	59,500	-7,740	-12%
Ammonia	49.5	51.1	101	124	23.5	23%
Nitrate+Nitrite as N	252	416	669	554	-114	-17%
Total Kjeldahl Nitrogen	343	448	791	790	-1.42	0%
Total Nitrogen	596	864	1,460	1,344	-116	-8%
Dissolved Phosphorous	77.1	143	220	110	-110	-50%
Total Phosphorous	107	201	309	163	-145	-47%
Total Cadmium	0.224	0.413	0.637	0.340	-0.298	-47%
Total Chromium	3.68	6.76	10.4	5.50	-4.94	-47%
Total Copper	7.38	16.50	23.9	7.82	-16.1	-67%
Total Lead	19.0	34.9	53.9	27.8	-26.1	-48%
Total Nickel	5.21	9.54	14.7	7.58	-7.17	-49%
Total Zinc	85.3	188	274	92.4	-181	-66%
Fecal Coliforms (billions of colonies)	1,272,951	2,322,614	3,595,565	1,849,326	-1,746,238	-49%
Stormwater Volume (acre-feet)	94.5	179.5	274	171	-102.5	-37%

SOURCE: PBS&J 2009

a. The 'Difference' columns denote the difference between Project and Existing annual pollutant loads; a negative difference indicates that pollutant loads are lower with development of the Project compared to existing conditions.

The estimated increase in ammonia would result from the conversion of Candlestick Park stadium and associated parking lots to a mix of residential, commercial and open space. The concentration of ammonia (in the cited literature) from residential and open space land uses is approximately four times the concentration from commercial lands (which was conservatively used to estimate existing loads from the stadium and parking lots). Thus, although development at Candlestick Point would mostly decrease pollutant concentrations, it could increase the concentrations of ammonia in stormwater runoff.

Development at Candlestick Point would be required to comply with the provisions of Municipal Stormwater General Permit and the associated SWMP, the Draft San Francisco Stormwater Design Guidelines, and San Francisco Green Building Ordinance. Consistent with these requirements, the Project Applicant would be required to submit a Stormwater Drainage Master Plan (SDMP) and Stormwater Control Plan (SCP) to the SFPUC, to identify the specific stormwater treatment BMPs that would be implemented.

When finalized, the Stormwater Design Guidelines[598] are anticipated to apply to all projects greater than 5,000 square feet, and projects in areas subject to San Francisco's Green Building Ordinance, including Candlestick Point. Per the guidelines, the performance standard requires the capture and treatment of

[598] Draft Stormwater Design Guidelines were released in February 2009[598] and are expected to be adopted by the end of 2009.

runoff from either: 0.75 inch of precipitation (if volume-based BMPs are used) or a rainfall intensity of 0.2 inch per hour (if flow-based BMPs are used).

Preliminary stormwater infrastructure plans for Candlestick include a dual-pipe system to convey stormwater runoff; one system would treat runoff at the parcel level, and a second system would convey runoff from roads to centralized facilities for treatment. The Project Applicant has also developed a stormwater LID Study,[599] which summarizes preliminary concepts for the integration of these two systems by distributing BMPs throughout the site, so that runoff is treated close to the source. Some of the types of BMPs that may be implemented at the Candlestick Point include:

- Dry Detention Ponds/Dry Ponds
- Infiltration Basins
- Wetland Basins
- Biofilter
- Vegetated Swales and Filter Strips
- Grassed Channels
- Bioretention
- Media Filters
- Hydrodynamic Separators
- Pervious Pavement

The following mitigation measure shall be implemented to reduce the presence of pollutants in stormwater runoff:

MM HY-6a.1 *Regulatory Stormwater Requirements. The Project Applicant shall comply with requirements of the Municipal Stormwater General Permit and associated City SWMP, appropriate performance standards established in the Green Building Ordinance, and performance standards established by the SFPUC in the San Francisco Stormwater Design Guidelines.*

The Draft San Francisco Stormwater Design Guidelines have been developed to satisfy the Municipal Stormwater General Permit requirements for new development and redevelopment projects in areas served by separate storm sewers, and are expected to be adopted by December 2009. The Project Applicant shall comply with requirements of the Draft San Francisco Stormwater Design Guidelines. Upon adoption of the Final Stormwater Design Guidelines, the Project shall comply with the Final San Francisco Stormwater Design Guidelines unless discretionary permits have been approved.

Per the Draft San Francisco Stormwater Design Guidelines, the Project Applicant shall submit a SCP to the SFPUC, as part of the development application submitted for approval. The SCP shall demonstrate how the following measures would be incorporated into the Project:

- *Low impact development site design principles (e.g., preserving natural drainage channels, treating stormwater runoff at its source rather than in downstream centralized controls)*

[599] Arup North America, Ltd., Lennar Urban, Candlestick Point/Hunters Point Shipyard LID Stormwater Opportunities Study, June, 2009. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

- *Source control BMPs in the form of design standards and structural features for the following areas, as applicable:*
  - *Commercial areas*
  - *Restaurants*
  - *Retail gasoline outlets*
  - *Automotive repair shops*
  - *Parking lots*
- *Source control BMPs for landscaped areas shall be documented in the form of a Landscape Management Plan that relies on Integrated Pest Management[600] and also includes pesticide and fertilizer application guidelines.*
- *Treatment control measures (e.g., bioretention, porous pavement, vegetated swales) targeting the Project-specific COCs: sediment, pathogens, metals, nutrients (nitrogen and phosphorus compounds), oxygen-demanding substances, organic compounds (e.g., PCBs, pesticides), oil and grease, and trash and debris. The SCP shall demonstrate that the Project has the land area available to support the proposed BMP facilities sized per the required water quality design storm. Volume-based BMPs shall be sized to treat runoff resulting from 0.75 inches of rainfall (LEED® SS6.2), and flow-based BMPs shall be sized to treat runoff resulting from a rainfall intensity of 0.2 inches per hour. Treatment trains shall be used where feasible.*

Additional requirements:

- *LEED® SS6.2: BMPs used to treat runoff shall be designed to remove 80 percent of the average annual post-development total suspended solids loads. BMPs are considered to meet these criteria if they are designed in accordance with SFPUC requirements.*
- *The SCP shall include an Operations and Maintenance Plan that demonstrates how the treatment control BMPs would be maintained in the long term, what entities would be responsible for BMP maintenance within the public and private rights-of-way, funding mechanisms, and what mechanisms would be used to formalize maintenance and access agreements.*
- *The Project Applicant shall also prepare a Stormwater Drainage Master Plan (SDMP) for approval by the SFPUC. The SDMP shall include plans for the storm drain infrastructure and plans for stormwater management controls (e.g., vegetated swales, dry wells). The storm drain infrastructure shall illustrate conveyance of the 5-year storm event in a separate storm drain piped system, and conveyance of the 100-year storm event in the street and drainage channel rights-of-way.*

Recycled Water

Development at Candlestick Point would have to comply with the Green Building Ordinance, including the provisions of LEED® WE 1.1, which requires reducing the use of potable water for landscaping by a minimum of 50 percent. This could be met by reducing total water use for landscaping, or alternatively by using recycled water for landscaping, if such supply is available from the SFPUC.

[600] IPM is a strategy that focuses on long-term prevention or suppression of pest problems (i.e., insects, diseases and weeds) through a combination of techniques including: using pest-resistant plants; biological controls; cultural practices; habitat modification; and the judicious use of pesticides according to treatment thresholds, when monitoring indicates pesticides are needed because pest populations exceed established thresholds.

To produce and distribute recycled water, the SFPUC would have to treat the water to CCR Title 22 tertiary treatment standards and obtain coverage under the Recycled Water General Permit, which has been adopted to protect water quality standards.[601] To obtain coverage under the Recycled Water General Permit, the SFPUC would be required to submit an NOI and an Operations and Maintenance Plan to the SWRCB for approval. The Operations and Maintenance Plan would identify inspection, monitoring, and reporting requirements, and specify prohibited uses, site suitability, application rates, and salinity management measures. Compliance with the Recycled Water General Permit would ensure that the use of recycled does not cause an exceedance of water quality standards or contribute to or cause a violation of applicable waste discharge requirements.

To demonstrate compliance with the Recycled Water General Permit and the SFPUC's Operations and Maintenance Plan, the following mitigation measure shall be implemented to require preparation of a Landscape Irrigation Plan, to minimize the potential for off-site transport of pollutants in the runoff of recycled water and reduce any potential water quality impacts associated with use of recycled water for landscape irrigation.

MM HY-6a.2 *Recycled Water Irrigation Requirements. Prior to application of recycled water at the Project site for landscape irrigation, the Project Applicant shall demonstrate compliance with all terms and conditions of the SFPUC's Operations and Maintenance Plan and the Recycled Water General Permit conditions for the use of recycled water. As required by the Recycled Water General Permit, the Project Applicant shall submit an Operations and Maintenance Plan and an Irrigation Management Plan to the SWRCB. The Project Applicant shall also submit the Operations and Maintenance Plan and the Irrigation Management Plan to the SFPUC. Prior to on-site application of recycled water, the Project Applicant shall obtain written confirmation from the SFPUC that the Project Operations and Maintenance Plan and the Irrigation Management Plan is in compliance with the SFPUC's Operations and Maintenance Plan, and other SFPUC requirements for the use of recycled water.*

All recycled water provided to Project Applicant, pursuant to the Recycled Water General Permit, shall be treated in and managed in conformance with all applicable provisions of the Recycled Water Policy and shall meet Title 22 Requirements for disinfected tertiary recycled water as described in CCR Title 22, sections 60301.230 and 60301.320.

In accordance with the Recycled Water General Permit, the Project Applicant's Operations and Maintenance Plan shall describe methods and procedures for complying with recycled water regulations, and the maintenance of equipment and emergency backup systems to maintain compliance with the General Permit conditions and California Department of Public Health (CDPH) requirements. The Project Applicant shall ensure that all users of recycled water comply with the Operations and Maintenance Plan by developing educational materials (e.g., pamphlet or brochure) that convey key operational elements (e.g., prevention of cross-connections) of the plan.

In accordance with the Recycled Water General Permit, the Project Applicant's Irrigation Management Plan shall include measures to ensure the use of recycled water occurs at an agronomic rate while employing practices to minimize application of salinity constituents. The Irrigation Management Plan shall account for soil characteristics, recycled water characteristics, plant species irrigation requirements, climatic conditions, supplemental nutrient additions to support plant growth, and management of

[601] SWRCB, 2009, State Water Resources Control Board Water Quality Order No. 2009-0006-DWQ General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water, p. 9.

impoundments used to store or collect recycled water. The Irrigation Management Plan shall describe any conditions of approval required by the City, CDPH or SWRCB.

The Project Applicant shall implement the following landscape irrigation BMPs in accordance with Recycled Water General Permit Requirements:

- *The Operations and Maintenance Plan shall include leak detection methods and correction within 72 hours of identifying a leak or prior to the release of 1,000 gallons.*
- *Recycled water shall not be applied during precipitation events.*
- *Impoundment areas shall be managed such that no discharge occurs from storms smaller than the 25-year, 24-hour event.*

The Project Applicant shall also implement BMPs for general operational controls, protection of workers and the public (e.g., education about not drinking recycled water), and efficient irrigation (e.g., dedicated landscape water meters for monitoring water usage and leak detection).

The Project Applicant shall conduct monthly monitoring to quantify the volume of recycled water applied, the locations and total area of application, and the mass of nitrogen and salinity constituents applied.

Dry Weather Flows

Dry weather flows can be generated by urban development from landscape irrigation runoff; driveway and sidewalk washing; vehicle washing; groundwater seepage; fire-fighting flows; potable water line operations and maintenance discharges; and other permitted and/or illegal non-storm water discharges.[602] Dry weather runoff is principally a water quality concern[603] as it may be a significant source of bacteria and other constituents. Dry weather flow quantities are typically estimated from monitoring data and cannot be predicted using normal hydrologic projections. The total flow volume from dry weather flow can be up to 10 to 30 percent of total runoff and dry weather flow is typically comprised of numerous small events while wet weather runoff is mainly comprised of several large events.[604,605] Drainage system capacity is typically not a concern for conveying dry weather flows.[606]

The concentrations and types of constituents in dry weather urban runoff may be different than for stormwater runoff. For example, irrigation runoff often has been shown to have higher pesticide concentrations than stormwater runoff.[607] However, long-term mean concentrations for most pollutants are likely to be lower in dry weather flows that stormwater flows.[608] Dry weather flows are typically low in sediment (TSS) because flow rates are relatively low and coarse suspended sediment tends to settle or be filtered by vegetation. Consequently, pollutants that tend to associate with suspended solids (e.g., phosphorous, some bacteria, trace metals, and pesticides) are typically found in very low concentrations in dry weather flows. Dry weather constituents are

602 City of Huntington Beach, 2005, Citywide Urban Runoff Management Plan. p. 2-2.
603 City of Huntington Beach, 2005, Citywide Urban Runoff Management Plan. p. 2-2.
604 Southern California Coastal Water Research Project, 2008, Project: Dry Weather Water Quality in Ballona Creek, http://www.sccwrp.org/view.php?id=262, accessed October 12, 2009.
605 City of Huntington Beach, 2005, Citywide Urban Runoff Management Plan. P 3-2.
606 City of Huntington Beach, 2005, Citywide Urban Runoff Management Plan. P 2-2.
607 Schiff, K. and L. Tiefenthaler, 2003. Contributions of Organophosphorus Pesticides from Residential Land Uses during Dry and Wet Weather. Southern California Coastal Water Research Project, Technical Report 406. www.ocwatersheds.com/watersheds/pdfs/San_Diego_Organophorus_406_pesticides.pdf.
608 Duke, L.D., T.S. Lo, and M.W. Turner, 1999. "Chemical Constituents in Storm Flow vs. Dry Weather Discharges in California Storm Water Conveyances." J. of the American Water Resources Association, 35(4):821-836.

typically dissolved constituents (e.g., nitrate, trace metals, pesticides), or constituents that are small enough to be effectively transported (e.g., pathogens and oil and grease).

Stormwater quality treatment BMPs at Candlestick Point would be implemented under the SDMP and SCP prepared pursuant to mitigation measure MM HY-6a.1. These BMPs would be permanent features at Candlestick Point and would be available year-round to capture and treat both dry weather flows and stormwater runoff and would therefore reduce pollutants that may be present in dry weather runoff. In addition, mitigation measure MM HY-6a.2, to require an Irrigation Management Plan for recycled water use, would reduce the potential for irrigation of landscaping to contribute to dry weather flows. Implementation of mitigation measures MM HY-6a.1 and MM HY-6a.2 would reduce the impact of dry weather flows on water quality to a less-than-significant level.

Summary of Impact at Candlestick Point

Compliance with applicable regulatory requirements and implementation of the mitigation measures referenced in this discussion would ensure that water quality standards would not be exceeded nor would the development at Candlestick Point cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Impact of Hunters Point Shipyard Phase II

Impact HY-6b **Implementation of the Project at HPS Phase II would not contribute to violations of water quality standards or waste discharge requirements. (Less than Significant with Mitigation) *[Criterion M.a]***

Similar to the discussion above in Impact HY-6a, development at HPS Phase II could generate stormwater runoff, which could affect water quality and could involve the use of recycled water. In addition, maritime activities associated with the proposed marina could contribute contaminants to receiving waters, which could affect water quality.

Stormwater Runoff

Development of HPS Phase II would include installation of a separate stormwater system, which would be regulated under the Municipal Stormwater General Permit. Development at HPS Phase II would remove existing land uses, including industrial and former shipyard uses that contain approximately 326.8 acres[609] of impervious surface, and replace them with new mixed land uses, including residential, commercial, office, R&D, open space, and a new football stadium, with approximately 213.7 acres[610] of impervious surfaces. Thus, implementation of HPS Phase II would reduce the area of impervious cover by approximately 35 percent. The reduction of impervious surfaces would reduce the volume of stormwater runoff from this area and the extent of impervious area that could contribute pollutants in runoff. In addition, the change in land use would affect the types and amounts of pollutants that could be present in stormwater runoff.

Table III.M-4 (Estimeated Change in Annual Pollutant Loads from HPS Phase II without BMPs) identifies the estimated change in annual pollutant loads (without the implementation of BMPs) at HPS Phase II

[609] IBI Group, August 21, 2009.
[610] IBI Group, August 21, 2009.

that would result from development. (The column for off-site residential loads represents the contributions to the on-site stormwater drainage system from HPS Phase I.) As a result of the conversion of primarily industrial lands to open space, residential, and commercial land, estimated pollutant loads would be substantially reduced by approximately 34 to 74 percent.

Table III.M-4 Estimated Change in Annual Pollutant Loads from HPS Phase II without BMPs

Pollutant	*Existing (lbs)*	*Project (lbs)*	*Difference (%)*	*Off-site Residential (lbs)*
Total Suspended Solids	304,776	113,803	-63%	*24,822*
Ammonia	625	160	-74%	*85.4*
Nitrate+Nitrite as N	1,319	864	-34%	*268*
Total Kjeldahl Nitrogen	4,026	1,133	-72%	*494*
Total Nitrogen	5,345	1,997	-63%	*762*
Dissolved Phosphorous	386	142	-63%	*68.8*
Total Phosphorous	604	235	-61%	*92.5*
Total Cadmium	1.49	0.485	-67%	*0.202*
Total Chromium	26.9	7.91	-71%	*3.32*
Total Copper	43.0	13.8	-68%	*3.63*
Total Lead	105	36.6	-65%	*17.3*
Total Nickel	18.5	9.18	-50%	*4.75*
Total Zinc	496	159	-68%	*44.6*
Fecal Coliforms (billions of colonies)	4,262,577	2,182,629	-49%	1,173,810
Stormwater Volume (acre-feet)	465.8	229.8	-40%	78.7

SOURCE: PBS&J 2009

As discussed above, mean annual pollutant loads are a function of both the concentration of pollutants, and the total amount of runoff from an area. Development at HPS Phase II would decrease the extent of impervious surfaces and therefore decrease stormwater runoff volumes (by approximately 40 percent), while changes in land use would affect the concentration of pollutants in stormwater. The net effect of these changes would be a net decrease in the total pollutants loads, even without the implementation of stormwater treatment BMPs.

Development at HPS Phase II would be required to comply with the provisions of Municipal Stormwater General Permit and the associated SWMP, the Draft San Francisco Stormwater Design Guidelines, and San Francisco Green Building Ordinance. Consistent with these requirements, the Project Applicant would be required to submit a SDMP and SCP to the SFPUC, which would identify the specific stormwater treatment BMPs that would be implemented. To minimize the potential for stormwater pollutants to adversely affect water quality, mitigation measure MM HY-6-a.1 would be implemented.

As discussed above, although the specific BMPs that will be implemented have yet to be identified, the stormwater LID Study identified various stormwater treatment opportunities. However, the use of infiltration BMPs on the HPS Phase II site would be precluded by site constraints related to soil and

physical characteristics and the presence of contaminants in soil associated with historic land uses. Further, the potential for stormwater BMPs to result in the mobilization of historic contaminants in soil would be reduced by the placement of fill soils in various locations to raise the land surface above the base-flood elevation (as discussed in Section III.L), thus increasing the height of soil cover in those locations.

Prior to the transfer of the HPS Phase II site, all necessary remedial actions at HPS Phase II required by CERCLA, the FFA, or other applicable law, must be completed to the satisfaction of the relevant regulatory agencies, and those agencies must determine that the site is suitable for its intended use. The Navy would implement Institutional Controls (ICs) for cleanup at HPS Phase II. These IC's are legal and administrative mechanisms to implement land use restrictions to limit the exposure of future landowners and users to hazardous materials, and to ensure the integrity of remedial activities. The mitigation measures set forth in Section III.K require compliance with these requirements. Mitigation measure MM HZ-1b would require the San Francisco Department of Public Health to verify, before any development activity occurs at HPS Phase II, that remediation as been completed in compliance with all restrictions imposed for the site. Mitigation measure MM HZ-2a.1 (Unknown Contaminant Contingency Plan) would ensure that potential risks associated with unknown contamination sites are minimized. Mitigation measures MM HZ-5a (Foundation Support Piles Installation Plan), MM HZ-9 (Navy-Approved Workplans for Construction and Remediation Activities on Navy-Owned Property), MM HZ-10b (Regulatory Agency-Approved Workplans and Permits for Shoreline Improvements), and MM HZ-12 (Compliance with Administrative Order of Consent at Early Transferred Parcels), and MM HZ-15 (Asbestos Dust Mitigation and Control Plans) also include measures to protect water quality. With these mitigation measures, the potential for historic soil contamination to be mobilized by stormwater runoff would be minimized.

Although open spaces at HPS, Phase II would capture rainfall which could percolate into the soil, compliance with mitigation measures identified above would reduce the potential for mobilization of contaminants in soil from historic uses. The use of stormwater infiltration BMPs, which would enhance percolation of runoff, could increase the potential for mobilization of soil contaminants. To reduce this potential, mitigation measure MM HY-6b.1 would prohibit use of infiltration BMPs and require lined stormwater conveyance systems at HPS Phase II to protect groundwater quality.

MM HY-6b.1 *Limitations on Stormwater Infiltration: Infiltration BMPs on HPS Phase II shall be prohibited. Alternative BMPs for stormwater quality control, reuse, and treatment shall be used. For instance, biofiltration BMPs can be implemented with an impervious liner and subdrain system to treat stormwater runoff while preventing infiltration. Overland flow (greater than the five-year and up to the 100-year storm) shall be conveyed in lined channels or other conveyances that will not result in infiltration.*

Stormwater from Industrial Activities

HPS Phase II development would include R&D space within certain areas and some potential uses within this land use category could be considered industrial activities for the purposes of a stormwater permit. Any such industrial uses would be required to obtain coverage under the Industrial General Permit for stormwater discharges. Implementation of mitigation measure MM HY-6b.2 would ensure compliance with the Industrial General Permit, as necessary, which would require the development and implementation of an industrial SWPPP to reduce potential impacts.

MM HY-6b.2 *Industrial General Permit: The Facility Operator shall apply for an Industrial General Permit prior to operational activities for facilities requiring coverage under the Industrial General Permit, which is determined based on the facility's SIC. The Facility Operator shall comply with all provisions in the Industrial General Permit, including implementation of a SWPPP, to effectively control pollutants to the BAT/BCT during the normal course of operations. Primary components and pollution prevention measures that the SWPPP shall address are described below. The Facility Operator shall refer to the California Stormwater Quality Association Stormwater Best Management Practice Handbook – Industrial and Commercial or equivalent[611] for details on BMP implementation. The SFRWQCB is responsible for overseeing Industrial General Permit activities, including SWPPP compliance. The following BMPs shall be incorporated into the SWPPP.*

Non-Structural BMPs

- *Good Housekeeping: Good housekeeping generally consists of practical procedures to maintain a clean and orderly facility.*
- *Preventive Maintenance: Regular inspection and maintenance of structural stormwater controls (catch basins, oil/water separators, etc.) as well as other facility equipment and systems.*
- *Spill Response: Spill clean-up procedures and necessary clean-up equipment based upon the quantities and locations of significant materials that may spill or leak.*
- *Material Handling and Storage: Procedures to minimize the potential for spills and leaks and to minimize exposure of significant materials to stormwater and authorized non-stormwater discharges.*
- *Employee Training: Training of personnel who are responsible for (1) implementing activities identified in the SWPPP, (2) conducting inspections, sampling, and visual observations, and (3) managing stormwater. The SWPPP shall identify periodic dates for such training. Records shall be maintained of all training sessions held.*
- *Waste Handling/Recycling: Procedures or processes to handle, store, or dispose of waste materials or recyclable materials.*
- *Recordkeeping and Internal Reporting: Procedures to ensure that all records of inspections, spills, maintenance activities, corrective actions, visual observations, etc., are developed, retained, and provided, as necessary, to the appropriate facility personnel.*
- *Erosion Control and Site Stabilization: This may include the planting and maintenance of vegetation, diversion of run-on and runoff, placement of sandbags, silt screens, or other sediment control devices, etc.*
- *Inspections: This includes, in addition to the preventative maintenance inspections identified above, an inspection schedule of all potential pollutant sources. Tracking and follow-up procedures shall be described to ensure adequate corrective actions are taken and SWPPP revisions are made as needed.*
- *Quality Assurance: Procedures to ensure that all elements of the SWPPP and Monitoring Program are adequately conducted.*

Structural BMPs to be Considered

- *Overhead Coverage: Structures that provide horizontal coverage of materials, chemicals, and pollutant sources from contact with stormwater and authorized non-stormwater discharges.*

[611] California Stormwater Quality Association, Stormwater Best Management Practice Handbook- Industrial and Commercial, January, 2003.

- *Retention Ponds: Basins, ponds, surface impoundments, etc. that do not allow stormwater to discharge from the facility.*
- *Control Devices: Berms or other devices that channel or route run-on and runoff away from pollutant sources.*
- *Secondary Containment Structures: This generally includes containment structures around storage tanks and other areas for the purpose of collecting any leaks or spills.*
- *Treatment: This includes inlet controls, infiltration devices, oil/water separators, detention ponds, vegetative swales, etc. that reduce the pollutants in stormwater discharges and authorized non-stormwater discharges. However, because of extensive site constraints, use of infiltration BMPs shall be limited.*

Recycled Water

As discussed above, under Impact HY-6a, the HPS Phase II may use recycled water from the SFPUC for landscaping to reduce potable water demand. Compliance with the Recycled Water General Permit would ensure that the use of recycled does not cause an exceedance of water quality standards or contribute to or cause a violation of applicable waste discharge requirements. The Operations and Maintenance Plan would identify inspection, monitoring, and reporting requirements, and specify prohibited uses, site suitability, application rates, and salinity management measures. The Irrigation Management Plan would demonstrate how the water is used effectively and what practices would be used to minimize application of salinity constituents. Mitigation measure MM HY-6a.2 would be implemented to ensure compliance with the Recycled Water General Permit and the SFPUC's Operations and Maintenance Plan for recycled water.

Dry Weather Flows

As discussed above, dry weather flows can be generated by urban development and have the potential to affect receiving water quality. Consistent with regulatory requirements, stormwater treatment BMPs would be implemented under the SDMP and SCP for wet weather runoff (per mitigation measure MM HY-6a.1) and these measures would also capture and treat dry weather flows. Mitigation measure MM HY-6a.2 would be implemented to reduce the potential discharge of polluted runoff from landscape irrigation with recycled water. Compliance with these requirements would ensure that the dry weather flows do not cause an exceedance of water quality standards or contribute to or cause a violation of applicable waste discharge requirements.

Marina Operations

Dredging

Development of the marina would include creation of two basins (by means of constructing breakwater in the Bay to form one 11.3 basin and one 10.7 basin) that would not require initial dredging, but may require ongoing maintenance dredging in the future. Dredging activities could result in the re-suspension of previously undisturbed in-Bay sediments, which could adversely affect water quality.[612] In-water disposal of dredge spoils has the potential to alter benthic and shoreline habitats and to increase water column turbidity.[613] The potential for maintenance dredging to result in impacts to Biological Resources is discussed

[612] San Francisco Estuary Institute (SFEI), Effects of Short-term Water Quality Impacts due to Dredging and Disposal on Sensitive Fish Species in San Francisco Bay, Prepared for Corps San Francisco District, 2008.
[613] California Regional Water Quality Control Board San Francisco Bay Region, 2007, op. cit.

in Section III.N; refer to mitigation measures MM BI-18b.1 (Maintenance Dredging and Turbidity Minimization Measure for the Operation of the Marina), MM BI-18b.2 (Implement BMPs to Reduce Impacts of Dredging to Water Quality), MM BI-19b.1 (Work Windows to Reduce Maintenance Dredging Impacts to Fish during Operation of the Marina), and MM BI-19b.2 (Implement BMPs to Reduce Impacts of Dredging to Water Quality). Compliance with applicable DMMO regulatory requirements would ensure that maintenance dredging operations do not cause an exceedance of water quality standards or contribute to or cause a violation of applicable waste discharge requirements. Implementation of these mitigation measures would reduce the water quality impacts from marina dredging and a less than significant impact would result.

Operational Discharges

The discharge of stormwater runoff from the marina would be regulated under the Municipal Stormwater General Permit, which would require the preparation of a SDMP and SCP, consistent with mitigation measure MM HY-6-a.1.

In addition, the marina operator would be required to obtain certification of by the Clean Marinas California Program to reduce potential water quality affects associated with marina operations. To ensure compliance with these requirements, mitigation measure MM HY-6b.3 would be implemented.

MM HY-6b.3 *Clean Marinas California Program: The marina operator shall obtain certification under the Clean Marinas California Program. The Clean Marinas California Program has developed marina BMPs and an inspection and certification process for marinas that meet the program standard for BMP implementation. The marina operator shall implement BMPs that address the following sources of pollution: petroleum containment, topside boat maintenance and cleaning, underwater boat hull cleaning, marina operations, marina debris, boat sewage discharge, solid waste, liquid waste, fish waste, hazardous materials, and stormwater runoff.*

No fueling facilities are proposed as part of marina operations. However, if maintenance activities such as rehabilitation, mechanical repairs, painting, and lubrication or equipment cleaning operations are conducted, stormwater runoff from the marina would also be regulated under the Industrial General Permit. Compliance with the requirements of the Industrial General Permit (for applicable portions of the marina, if any) would reduce potential water quality impacts. Implementation of mitigation measure MM HY-6b.2 (to obtain coverage under the Industrial General Permit) would ensure compliance with the requirements for any maintenance operations.

Summary of Impact at Hunters Point Shipyard, Phase II

Compliance with applicable regulatory requirements and implementation of all of the mitigation measures referenced in this discussion would ensure that water quality standards would not be exceeded nor would the development at HPS Phase II cause or contribute to a violation of the applicable WDRs. A less-than-significant impact would result.

Impact of Yosemite Slough Bridge

Impact HY-6c **Implementation of the Yosemite Slough bridge would not contribute to violations of water quality standards or waste discharge requirements. (Less than Significant) *[Criterion M.a]***

Stormwater runoff from the Yosemite Slough bridge and discharges of materials from bridge maintenance activities would not cause or contribute to an exceedance of water quality standards. Primary pollutants of concern in stormwater runoff from transportation-related land uses include fuels, PAHs, sediment, metals, and litter and debris. The pollutants could originate from automobiles, transit vehicles, cyclists, and pedestrians. Automobiles would only be a source of stormwater pollutants on game days, which occur twelve days out of the year, because the bridge would only allow automobile traffic on game days. As described in Chapter II (Project Description) on page II-38, the Yosemite Slough bridge would be constructed with a 40-foot-wide greenway, which would be converted to automobile travel lanes on 49ers game days only. The greenway would also provide vegetative treatment for stormwater pollutants associated with automobiles, and would reduce the impacts of automobile-related stormwater runoff to a less than significant level. Runoff from the transit vehicle lanes would also be routed to the greenway and/or to land-based stormwater treatment controls such as swales. The stormwater treatment measures for the bridge would be described in the Project's Stormwater Control Plan, which is subject to SFPUC's approval.

Bridge maintenance activities such as welding and grinding, sandblasting, and painting can also adversely affect water quality if materials generated from maintenance are allowed to discharge into the Bay. It is anticipated that bridge operation would be under the jurisdiction of the City, and thus stormwater runoff mitigation would be performed under the Municipal Stormwater General Permit, which requires development of a pollution prevention program for municipal operations. The municipal operations program would also include street sweeping to remove litter and sediment-associated pollutants generated by transportation land uses.

Pollutants generated from transit vehicles, cyclists and pedestrians would also be addressed under the pollution prevention program for municipal operations implemented by the City. The pollutants would also be reduced through compliance with local stormwater treatment requirements (i.e., San Francisco Stormwater Design Guidelines), which were put into effect to comply with the new development requirements in the Municipal Stormwater General Permit.

Impacts from bridge operation would be reduced via compliance with the existing stormwater runoff programs, specifically, elements of the Municipal Stormwater General Permit, and local requirements for stormwater treatment measures that would be subject to approval by the SFPUC. Operation of the Yosemite Slough bridge would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements and a less than significant impact would result. No mitigation is required.

Combined Impact of Candlestick Point, Hunters Point Shipyard Phase II, and Yosemite Slough Bridge

Impact HY-6 **Implementation of the Project would not contribute to violations of water quality standards or waste discharge requirements. (Less than Significant with Mitigation) *[Criterion M.a]***

As discussed in Impact HY-6a through Impact HY-6c, compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the Project. In addition, the project would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measures MM BI-18b.1 (Maintenance Dredging and Turbidity Minimization Measure for the Operation of the Marina), MM BI-18b.2 (Implement BMPs to Reduce Impacts of Dredging to Water Quality), MM BI-19b.1 (Work Windows to Reduce Maintenance Dredging Impacts to Fish during Operation of the Marina), and MM BI-19b.2 (Implement BMPs to Reduce Impacts of Dredging to Water Quality). Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.3. Compliance with applicable regulatory requirements and implementation of the identified mitigation measures would ensure the Project would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements and a less than significant impact would result.

Impact HY-7: Other Water Quality Effects

Impact HY-7 **Implementation of the Project would not otherwise degrade water quality. (Less than Significant with Mitigation) *[Criterion M.f]***

Stormwater and recycled water infiltration to groundwater could degrade groundwater quality. One of the Project's stormwater management strategies includes infiltration of stormwater runoff in Candlestick Point, where feasible, using permeable pavement, bioretention basins and other measures, to control peak flow rates, reduce total runoff volumes, and reduce the potential quantity of pollutants in residual surface runoff. Urban stormwater runoff contains a variety of pollutants that could potentially reach groundwater aquifer via infiltration. Research on groundwater effects resulting from stormwater infiltration indicate that the potential for groundwater contamination via infiltration depends on several pollutant- and site-specific environmental factors such as: (1) precipitation, irrigation, dry weather runoff, and temperature patterns;

(2) soil properties such as texture; clay content, mineral content, organic matter and microbial content; and presence of structural voids; and (3) depth to the groundwater table.[614]

Chemical characteristics of the potential stormwater COCs and recycled water constituents that could infiltrate to groundwater aquifer include (1) mobility (measured by parameters such as solubility, sorption coefficients, and vapor pressure) and persistence (measured by the half-life) in soil; (2) use patterns; and (3) abundance in stormwater and dry weather runoff.

Some stormwater pollutants such as metals, certain pesticides and herbicides, and pathogens tend to be filtered out by soils and have a low probability of leaching into groundwater. More mobile chemicals such as nitrate and other dissolved constituents (e.g., chemicals that contribute to total dissolved solids [TDS] such as chloride), have a greater potential for leaching into groundwater. Groundwater in portions of the Project site has been impacted by releases of various inorganic and organic constituents associated with current and previous land uses, and a remediation program is ongoing. DWR also indicates that elevated nitrate concentrations are the most common water quality problem with wells in the San Francisco Peninsula. Data from the National Stormwater Quality Database[615] indicate that stormwater runoff from land uses similar to the Project (e.g., mixed residential, commercial and industrial) has a total dissolved solids (TDS) concentration of about 80 mg/L and a nitrate (as nitrogen) concentration of about 0.6 mg/L; these concentrations would not be expected to adversely affect groundwater quality. Use of recycled water could increase groundwater salinity because recycled water tends to concentrate salts and have a higher salt content than potable water. However, the underlying groundwater basins are only designated as potential municipal or domestic water supplies. As such, there are no applicable water quality standards.

Implementation of mitigation measure MM HY-6a.1 would ensure compliance with the Municipal Stormwater General Permit, which would result in BMPs designed to treat stormwater runoff for nitrogen compounds and limit infiltration BMPs at Candlestick Point where site physical constraints (e.g., shallow depth to groundwater) are present. Limitations on infiltration BMPs would reduce the potential for nitrate and TDS leaching to groundwater. Mitigation measure MM HY-6b.1 would prohibit infiltration BMPs at HPS Phase II and further reduce the potential for nitrate and TDS degradation of groundwater quality underlying HPS Phase II. Implementation of mitigation measure MM HY-6a.2 would ensure compliance with the Recycled Water General Permit, resulting in application rates that do not exceed agronomic requirements. As such, the potential for recycled water, and associated nitrates and TDS, leaching to groundwater is minimized. Compliance with these mitigation measures would reduce the potential for nitrogen and salt migration to groundwater and Project degradation of groundwater quality would be less than significant.

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[614] Pitt, R., S. Clark, and K. Parmer, Potential Groundwater Contamination from Intentional and Non-Intentional Stormwater Infiltration, USEPA 600-SR-94-051, May 1994. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[615] A. Maestre, R. Pitt, and Center for Watershed Protection, *The National Stormwater Quality Database, Version 1.1, a Compilation and Analysis of NPDES Stormwater Monitoring Information*, prepared for U.S EPA, September 2005.

Impact HY-8: Groundwater Supplies and Groundwater Recharge

Impact HY-8 **Implementation of the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (No Impact) *[Criterion M.b]***

The Project would not use groundwater as a source of water supply, and would, therefore, not deplete groundwater supplies. The Project site is currently primarily impervious surfaces and would not, therefore, substantially contribute to groundwater recharge. The Project would remove existing structures, including Alice Griffith Housing, Candlestick Park stadium, and the parking lots surrounding the stadium which include approximately 178.5 acres[616] of impervious surfaces. The proposed development of new mixed land uses at Candlestick Point would include residential, commercial, office, and recreational uses, which could include approximately 165.4 acres[617] of impervious surfaces. Development at Candlestick Point would result in an approximate 7 percent decrease in impervious surfaces, which could increase infiltration. At HPS Phase II, the Project would remove existing improvements, including industrial and former shipyard uses that contain approximately 326.8 acres[618] of impervious surfaces. The proposed development at HPS Phase II consisting of new mixed land uses, including residential, commercial, office, R&D, open space, and a new football stadium, would result in approximately 213.7 acres[619] of impervious surfaces. Thus, implementation of HPS Phase II would decrease the impervious cover of the HPS Phase II area by approximately 35 percent, which could increase infiltration (via natural percolation of rainfall, as stormwater infiltration BMPs would be prohibited by mitigation measure HY-6b.1). Overall, development of the Project would result in a decrease in impervious surfaces of approximately 25 percent. By decreasing the extent of impervious cover and by limiting stormwater infiltration BMPs to Candlestick Point, development at the Project would not interfere with groundwater recharge or substantially deplete groundwater supplies, and thus no impact would occur. No mitigation is required.

Impact HY-9: Erosion or Siltation Effects

Impact HY-9 **Implementation of the Project would not alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, and would not result in substantial erosion or siltation on site or off site. (Less than Significant with Mitigation) *[Criterion M.c]***

As discussed above in Constructions Impacts, Project grading would not substantially alter the drainage pattern of the site. Off-site erosion or siltation impacts from new development can occur in the form of stream channel hydromodification,[620] caused by increased impervious cover that increases stormwater peak

[616] IBI Group, August 21, 2009.
[617] Ibid.
[618] IBI Group, August 21, 2009.
[619] Ibid.
[620] Hydromodification refers to the change in the stream flow hydrograph (e.g., flow rate, timing of peak flows, flow duration, and flow volume). Stream channels are formed as a function of the water flow patterns (hydrograph). When patterns change (e.g., changes in runoff to the stream), the channel form (e.g., depth, width, curvature, substrate) and function (e.g., habitat quality, habitat area) can be altered as beds and banks erode (or build up) in response to the change in flow regime.

flow rates, volumes, and durations into a water body susceptible to bed or bank erosion. The Project site would discharge to separate sewer systems or the Lower Bay, rather than surface water bodies susceptible to erosion and siltation. There are no streams or rivers at the Project site and the Project would not discharge directly or indirectly to a stream or river. Therefore, no impacts to streams or rivers would occur. Although some areas would continue to sheet flow to the Lower Bay, these areas would not receive additional flows from the developed portion of the Project site and the potential for increased erosion and sediment transport would be less than significant. In addition, implementation of mitigation measure MM HY-6a.1would require preparation of a SDMP and SCP to control post-construction erosion that incorporates erosion and sediment transport control BMPs. A less-than-significant impact would occur.

Impact HY-10: Flooding From Surface Runoff[621]

Impact HY-10 **Implementation of the Project would not alter the existing drainage pattern of the site, through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff, and would not result in flooding on site or off site. (Less than Significant with Mitigation)** ***[Criterion M.d]***

The Project would remove existing structures and uses at Candlestick Point, including Alice Griffith Housing, Candlestick Park stadium, and the parking lots surrounding the stadium which total approximately 178.5 acres[622] of impervious surface area. Proposed new land uses at Candlestick Point would include residential, commercial, office, and recreational uses, which would total approximately 165.4 acres[623] of impervious surface. Thus, development at Candlestick Point would reduce the area of impervious surfaces. The Project would also remove existing structures and uses at HPS Phase II, including industrial and former shipyard features that total approximately 326.8 acres[624] of impervious surface area. Proposed uses at HPS Phase II, including residential, commercial, office, R&D, open space, and a new football stadium, would total approximately 213.7 acres[625] of impervious surface area. Thus, implementation of HPS Phase II would also reduce the amount of impervious cover at HPS Phase II. Because of the increase in permeable surface area, infiltration would be expected to increase, resulting in a corresponding decrease in runoff volumes. Grading would reduce slopes at both sites, slowing runoff rates.

- The runoff flow rates and volumes do not account for the effect of Project BMPs.

- Table III.M-5 (Estimated Existing and Project Stormwater Peak Flow Rates and Runoff Volumes without BMPs) lists the estimated Project site stormwater runoff flow rates for existing and Project conditions, calculated using the Rational Method.[626] Details on flow rate calculations are provided in Appendix M1. For HPS Phase II, flow rates reported in Table III.M-5 do not include off-site flow from HPS Phase I. The City has required the HPS Phase II development to convey the 5-year storm event from HPS Phase I in the

[621] As discussed in the Setting, the Project site is not currently subject to flooding from a stream or river. Tidal flooding is discussed under Impacts HY-12a, 12b, 12, 13a, 13b, 13, and 14.
[622] IBI Group, August 21, 2009.
[623] Ibid.
[624] IBI Group, August 21, 2009.
[625] Ibid.
[626] City and County of San Francisco, Bureau of Engineering, Department of Public Works, Subdivision Regulations, for the Information and Guidance of all Subdividers, Engineers and Surveyors with reference to the Subdivision of Land within the City and County of San Francisco and to Supplement the Subdivision Code, January 6, 1982.

Project storm drain system (108 cfs of flow for the 5-year storm event) in addition to Project flows. However, HPS Phase I flows are existing flows, currently draining to the separate storm system. Therefore, although these flows must be accounted for in the sizing of Project storm drain infrastructure, they are not included in Table III.M-5 because they are not Project site flows and are not affected by development of the Project.

Table III.M-5 Estimated Existing and Project Stormwater Peak Flow Rates and Runoff Volumes without BMPs

			Project Increase[a]	
Storm Event	*Existing (cfs)[b]*	*Project (cfs)[c]*	*(cfs)*	*(%)*
Candlestick Point				
5-Year	477 (130)[d]	249 (0)[d]	-228	-48%
10-Year	545	284	-261	-48%
100-Year	783	408	-375	-48%
Hunters Point Shipyard[e]				
5-Year	644	448	-196	-30%
10-Year	730	509	-221	-30%
100-Year	1052	733	-319	-30%
2-year 24-hour (acre-feet)				
Candlestick Point	36	20	-16	-44%
HPS Phase II	64	39	-24	-38%

SOURCE: PBS&J 2009

a. A negative number denotes a reduction in Project flow rates compared to existing conditions.
b. Existing flows are based on 72 percent impervious surfaces (505.3 acres).
c. Project flows are based on 54 percent impervious surfaces 9379.1 acres).
d. Values in parenthesis denote the amount of total Candlestick Point site runoff flowing to the combined sewer system.
e. Off-site flow from HPS Phase I is not included in these runoff calculations. Required HPS Phase I diversions into the HPS Phase II separate stormwater sewer system would be 108 cfs.

As demonstrated in Table III.M-5, the runoff peak flow rates from the Project site would be reduced by an average of 39 percent. Although these calculations are based on estimated site characteristics, it is not likely that more detailed data would indicate a substantially lower peak flow rates. Table III.M-5 also shows that runoff volumes from the 2-year 24-hour storm (i.e., frequently occurring storms) would be reduced by implementation of the Project, which would also reduce flooding impacts.

Grading and fill placement would be required to bring surface elevations to a level appropriate for development (i.e., a level that would not be subject to flooding and that would support Project structures). Material removed from Candlestick Point would be used for embankments at HPS Phase II. The overall drainage pattern (runoff into a piped system for the majority of the Project site and sheet flow into the Lower Bay for remaining portions) would be preserved following development,[627] and no rivers or streams exist on site that would be altered by development. Most of the Project site would be graded with a 0.1 percent slope to facilitate overland flow, and the streets would have a waffling grade[628] of 0.5 percent to

[627] MACTEC Engineering and Consulting, Inc., *Proposed Infrastructure Plans and Implementation Schedule, Hunters Point/Candlestick Point Redevelopment Project,* Draft, July 7, 2008. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[628] A surface texture marked by ridges and valleys that would help to channel flow.

reduce localized stormwater ponding.[629] According to the City, new developments must ensure that stormwater runoff volumes, up to the volumes anticipated for a five-year storm event, would be adequately conveyed in pipes.[630] Storms larger than the five-year storm and up to the 100-year storm event should be conveyed adequately via overland flow, i.e., through street gutters and swales. The design objective for overland flow is to allow streets and sidewalks to fully contain the 100-year event without surcharging[631] (flooding) the adjacent development blocks.[632] Downstream flooding would not occur because the Project is directly upstream of the Bay.

As discussed in Impact HY-6a, p. III.M-114, the Project Applicant has developed a LID Study,[633] which identifies concepts for how the development could integrate stormwater volume reduction and treatment control measures. Mitigation measure MM HY-6a.1 would require preparation, and SFPUC approval, of a SDMP and SCP for the Project that would ensure that this impact is less than significant.

Impact HY-11: Storm Sewer System Capacity

Impact HY-11 **Implementation of the Project would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. (Less than Significant with Mitigation) *[Criterion M.e]***

A new separate storm sewer system would be constructed at the Project site in accordance with the design standards and criteria issued by the SFPUC and criteria in the San Francisco Subdivision Regulations.[634] The capacity design basis in those regulations specify that storm sewers should have sufficient capacity, when flowing full or surcharged (flow in manholes is above top of pipe), to carry the estimated stormwater runoff from the 5-year storm event, based on the ultimate development of the area, including natural drainage from upstream areas. Flows up to the five-year storm event would be carried in pipes, and larger flows, up to the 100-year storm, would be conveyed via overland flow, street rights-of-way, drainage channels, and pipes. As discussed in Impact HY-10, above, overall Project site development would result in an average of approximately 39 percent reduction in peak storm flows and would also reduce runoff volumes from frequently occurring storms. Implementation of mitigation measure MM HY-6a.1 and compliance with stormwater drainage capacity design criteria would ensure that impacts related to exceeding the capacity of the storm sewer system would be less than significant.

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[629] Ibid.
[630] City and County of San Francisco, Bureau of Engineering, Department of Public Works, Subdivision Regulations, for the Information and Guidance of all Subdividers, Engineers and Surveyors with reference to the Subdivision of Land within the City and County of San Francisco and to Supplement the Subdivision Code, January 6, 1982.
[631] Surcharging refers to overloading and flooding of the drainage system.
[632] Ibid.
[633] Arup North America, Ltd., Lennar Urban, Candlestick Point/Hunters Point Shipyard LID Stormwater Opportunities Study, June 2009. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[634] City and County of San Francisco, Bureau of Engineering, Department of Public Works, January 6, 1982, op. cit.

Impact HY-12: Housing within a 100-Year Flood Hazard Area

Impact of Candlestick Point

Impact HY-12a **Implementation of the Project at Candlestick Point would not place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. (Less than Significant with Mitigation) *[Criterion M.g]***

SFHAs shown on the preliminary FIRM for San Francisco and the Interim Floodplain Map are indicated in Figure III.M-4. Residential development at Candlestick Point could be placed within the area currently designated as Zone A.

The preliminary grading plan for Candlestick Point598 shows that the site would be graded such that the finished grade would be 3 feet higher than the Base Flood Elevation, and building finish floors would be 6 inches above that (total of 42 inches above Base Flood Elevation) per MM HY-12a.1 (Figure III.M-7 [Existing Flood Zones and Sea Level Rise [with Project Land Use Overlay and with Project Shoreline and Grading Improvements]). The Project grading plans indicate bayside elevations of +2.0 feet SFCD. The 100-year flood elevation with a 36-inch sea level rise would be +1.2 feet SFCD. Therefore, according to the current grading plan, development of Candlestick Point would be above the 100-year flood elevation with a safety factor of 36 inches to allow for future sea level rise.

Mitigation measure MM HY-12a.1 requires the Project Applicant to ensure that all finished grade elevations would be above the Base Flood Elevation and to request revision of the San Francisco Interim Floodplain Maps (or FIRMs, if adopted prior to Project implementation) to reflect new fill.

Implementation of mitigation measure MM HY-12a.1 would ensure that impacts associated with construction of housing within a 100-year flood hazard area, as designated on a flood hazard delineation map, would be less than significant.

MM HY-12a.1 *Finished Grade Elevations Above Base Flood Elevation. The Project site shall be graded such that finished floor elevations are 3.5 feet above the Base Flood Elevation (BFE), and streets and pads are 3 feet above BFE to allow for future sea level rise, thereby elevating all housing and structures above the existing and potential future flood hazard area. If the FIRM for San Francisco is not finalized prior to implementation of the Project, the Project Applicant shall work with the City Surveyor to revise the City's Interim Floodplain Map. If the FIRM for San Francisco is finalized prior to implementation of the Project, the Project Applicant shall request that the Office of the City Administrator (Floodplain Manager) request a Letter of Map Revision based on Fill (LOMR-F) from FEMA that places the Project outside a SFHA and requires that the FIRM is updated by FEMA to reflect revised regulatory floodplain designations.*

Rising sea levels is an ongoing phenomenon, which needs to be accounted for in the planning process to prevent future flooding or loss of infrastructure due to shoreline erosion. Planning for sea level rise includes three separate components (1) designing the perimeter to be flexible enough that crest elevations could be increased to prevent overtopping, (2) designing the development areas to be high enough that flooding would not occur around dwellings should the perimeter not function adequately, (3) designing the storm drainage system to be flexible enough that higher water levels would not result in overland flooding. It is obvious that while the perimeter and storm drain system could be upgraded over time, habitable structures cannot be raised.

SOURCE: RHAA, 2009.

PBS&J 11.2.09 08068 | JCS | 09

FIGURE III.M-7

Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING FLOOD ZONES AND SEA LEVEL RISE (WITH PROJECT LAND USE OVERLAY AND WITH PROJECT SHORELINE AND GRADING IMPROVEMENTS)

There is no current guidance or policy establishing numeric values for development projects along the Bay edge. The Federal Emergency Management Agency (FEMA) maps flood zones based on present day rainfall and tidal conditions, but regional and local agencies have taken a more proactive approach in reviewing development proposals because of the public infrastructure element for which they would be responsible.

A project specific sea level rise study was undertaken[635] to develop planning and design guidance through the various phases of the project. The study was based on an exhaustive review of the literature, recent guidance from regional agencies, and knowledge of coastal processes of San Francisco Bay. The literature on sea level rise estimates varies widely, from an observed value of 8 inches per century (historical measurements) to 33 inches per century (Intergovernmental Panel on Climate Change [IPCC] maximum estimate). News articles and semi-empirical studies (Rahmstorf 2007) based in part on recent measurements of ice cap melt, have stated that the increase in sea level rise over the next 100 years could be much higher than those estimated by the Intergovernmental Panel on Climate Change. Even among projections considered plausible, albeit high, by the CALFED Independent Science Board, a sea level rise of 36-inches would not occur until about 2075 to 2080 and by about 2100 the sea level rise could reach 55 inches. However, sea level observations since the publication date of the ice cap melt studies, although not conclusive to establish a new trend in sea level rise, do not show the accelerated sea level rise trajectory predicted by some of the reports.[636]

Project design for sea level rise meets both near term (2050) and long-range (2080) objectives; and in addition, incorporates an adaptive management strategy to address sea level rise for the most conservative estimates at 2100 and beyond. Since building structures are generally "immovable", whereas a perimeter and/or storm drain system can be adapted to keep up with changing sea levels, each was designed to a specific planning horizon as described below.

Development Design

For building structures, a 36-inch sea level rise allowance plus a freeboard of 6 inches was selected as the design criteria to use for design and construction. Per the most conservative rate of sea level rise (Rahmstorf 2007, which includes ice-cap melt estimate), a sea level rise of 36 inches would not occur until about 2080,[637] which would be approximately 50 years beyond the last phase of construction for the project. Ongoing measurements of sea level rise from the scientific community would be incorporated into Monitoring and Adaptive Management Plans, administered by a Geologic Hazard Abatement District (GHAD) or other entity with similar funding responsibility.[638] This entity would guide the decision-making process for implementation of future improvements, such as raising the perimeter. The proposed Monitoring and Adaptive Management Plan for the project would have the appropriate language that specifies management actions that would need to occur should sea level rise exceed 36 inches. Should sea level rise exceed 36 inches, the proposed project-specific funding mechanism (GHAD or similar) would pay for improvements.

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635 Moffatt & Nichol, Hunters Point Shoreline Structures Assessment, October 2009.
636 Rahmstorf, S., A. Cazenave, J.A. Church, J.E. Hansen, R.F. Keeling, D.E. Parker, and R.C.J. Somerville, 2007. *Recent Climate Observations Compared to Projections*. Science 316, p. 709.
637 Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project Initial Shoreline Assessment*, prepared for Lennar Urban, February, 2009, op. cit.
638 Moffatt & Nichol, *Hunters Point Shoreline Structures Assessment*, October 2009.

Perimeter and Storm System Design

For the perimeter system, it is not practical to build a high wall around the project for a design condition that may not happen for several decades. At the same time, it is not prudent to build to present sea level conditions and keep raising it as sea levels rise. Therefore, an interim sea level rise estimate for the year 2050, as put forth by BCDC and the State Coastal Conservancy,[639] was selected as the design criteria to use for design and construction. That sea level is 16 inches higher than the present, which will ensure that adaptive management construction activities are not triggered until at least the year 2050. In addition, the shoreline and public access improvements have been designed with a development setback to allow any future increases in elevation to accommodate higher sea level rise values, should they occur.

For the storm drain system, the same approach as the perimeter system described above was adopted. This will avoid installing pumps and other appurtenances at the present time, when they are not needed, while still ensuring that an adaptation strategy and a funding mechanism exists for future management actions.

Mitigation measure MM HY-12a.2 would require open space setbacks along the shoreline to allow for additional fill if the rate of future sea level rise is more rapid than currently anticipated. Implementation of mitigation measure MM HY-12a.2 would ensure flooding impacts associated with more rapid sea level rise would remain at a less-than-significant level.

- *MM HY-12a.2* *Shoreline Improvements for Future Sea-Level Rise. Shoreline and public access improvements shall be designed to allow future increases in elevation along the shoreline edge to keep up with higher sea level rise values, should they occur. Design elements shall include providing adequate setbacks to allow for future elevation increases of at least 3 feet from the existing elevation along the shoreline. Before the first Small Lot Final Map is approved, the Project Applicant must petition the appropriate governing body to form (or annex into if appropriate) and administer a special assessment district or other funding mechanism to finance and construct future improvements necessary to ensure that the shoreline, public facilities, and public access improvements will be protected should sea level rise exceed 16 inches at the perimeter of the Project. Prior to the sale of the first residential unit within the Project, the legislative body shall have acted upon the petition to include the property within the district boundary. The newly formed district shall also administer a Monitoring and Adaptive Management Plan to monitor sea level and implement and maintain the protective improvements.*

To guide the storm drain system design and establish the perimeter crest elevation, recent guidance from the Climate Change Center[640] and the policies adopted by the California State Coastal Conservancy[641] of using a 16-inch sea level rise by the year 2050 for a planning horizon were used. The storm drain system will, thus, function as a gravity-drained system up to the year 2050 and not require any management action until that point in time. Beyond the 16-inch sea level rise timeframe, the Adaptation Strategy described in mitigation measure HY-12a.2 shall be implemented, which will may consist of installing storm drain pumps that will be funded by the project funding mechanism established during the initial development phase.

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639 California State Coastal Conservancy. 2009. *Policy Statement on Climate Change.* Adopted at the June 4, 2009 Board Meeting. http://www.scc.ca.gov/index.php?p=75&more=1.
640 Cayan, D., P. Bromirksi, K. Hayhoe, M. Tyree, M. Dettinger, and R. Flick, 2006. *Projecting Future Sea Level.* California Climate Change Center report number CEC-500-2005-202-SF, dated March 2006.
641 California State Coastal Conservancy. 2009. *Policy Statement on Climate Change.* Adopted at the June 4, 2009 Board Meeting. http://www.scc.ca.gov/index.php?p=75&more=1.

Impact of Hunters Point Shipyard Phase II

Impact HY-12b **Implementation of the Project at HPS Phase II would not place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. (Less than Significant with Mitigation) *[Criterion M.g]***

According to proposed site plans, the portions of HPS Phase II that fall within a SFHA are proposed to be used for stadium parking. However, housing could be located in an area subject to flooding if the rate of sea level rise were to exceed the 36 inches that serves as the basis for Project grading plans and fill elevations, and no improvements were to be made along the shoreline.

Mitigation measure MM HY-12.a.1 requires Project finished grade elevations to be above the BFE accounting for future sea level rise. Mitigation measure MM HY-12a.2 requires that shoreline and public access improvements be designed to incorporate setbacks to accommodate sea level rise -related improvements. With implementation of this mitigation measure impacts pertaining to the placement of housing within a potential future mapped flood hazard area would remain at less-than-significant levels.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact HY–12 **Implementation of the Project would not place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. (Less than Significant with Mitigation) *[Criterion M.g]***

The Project would place housing within a SFHA according to the preliminary FIRM for San Francisco and the City's Interim Floodplain Map (refer to Figure III.M-4). However, the preliminary grading plan for the Project site[642] shows that the site would be graded to be above the Base Flood Elevation with a safety factor of +3 feet to allow for future sea level rise with building finish floor elevations 6 inches above that (total of 3.5 feet above Base Flood Elevation). Implementation of mitigation measures MM HY-12a.1 and MM HY-12a.2 would require that all housing be elevated out of the floodplain by grading and fill, that the City's Interim Floodplain Maps (or the FEMA maps, if adopted prior to Project implementation) be updated to reflect finished grade elevations, and that open space setbacks be put in place to allow protection against future sea level rise. These mitigation measures would ensure impacts pertaining to the placement of housing within a mapped flood hazard area remain at a less-than-significant level.

[642] Winzler & Kelly, Infrastructure Plan, Candlestick Point High Grading with Sea Level Rise, June 23, 2009. Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Impact HY-13: Structures within a 100-Year Flood Hazard Area

Impact of Candlestick Point

Impact HY-13a **Implementation of the Project at Candlestick Point would not place structures within a 100-year flood hazard area that could impede or redirect flood flows. (Less than Significant) *[Criterion M.h]***

Development at Candlestick Point could place structures within a SFHA (Zone A) according to the City's Interim Floodplain Map and the preliminary FIRM for the San Francisco (refer to Figure III.M-4). Placement of structures in a SFHA is primarily a concern within riverine floodways[643] because structures placed in the floodway could redirect flows away from a flooded channel into developed areas. If a development were proposed in a designated floodway, it would require a hydraulic/hydrologic analysis to show that it would not increase the Base Flood Elevation. This issue is not of significant concern at the Project site because the Interim Floodplain Map and the preliminary FIRMs do not designate any areas that would contain structures as regulatory floodways. Therefore, the impacts of development at Candlestick Point on impeding or redirecting flood flows would be less than significant. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact HY-13b **Implementation of the Project at HPS Phase II would not place structures within a 100-year flood hazard area or impede or redirect flood flows. (Less than Significant with Mitigation) *[Criterion M.h]***

Development at HPS Phase II could place structures within a SFHA (Zone A) according to the Preliminary FIRM for the San Francisco (refer to Figure III.M-4). However, structures within Zone A that do not fall within a designated floodway would not be expected to impede or redirect flood flows.

Development at HPS Phase II would also place structures, including the marina and the shoreline improvements, within a Zone V SFHA, according to the preliminary FIRM for San Francisco.[644] Structures in Zone V could be subject to high-velocity wave forces that could cause damage to the structures or redirection of flood flows onto other parts of the site. Existing piers within Zone V would only be used as breakwaters for the marina and for wildlife habitat uses, and no buildings would be constructed. The shoreline improvements, including open space public access areas, would be initially designed and constructed to accommodate a 16-inch increase in sea level rise, with an adaptive management approach to accommodate greater sea level rise increases should they occur, as required by mitigation measure MM HY-12a.2. This conservative shoreline design for sea level rise, as well as the development setback from the shoreline required by MM HY-12a.2, would protect the site against coastal flooding hazards including high-velocity wave forces that could impede flood flows or cause flood flows to be directed to any portions of the site including open space or developed areas. Implementation of MM HY-12a.2 would reduce the impacts of placing structures in a Zone V SFHA to a less-than-significant level.

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643 The floodway is the stream channel and portion of the adjacent floodplain that must remain open to permit passage of the base flood.

644 Although the City Administrator has requested revision of the preliminary FIRM to remove the Zone V designation at the Project site, it is conservatively assumed for the purposes of this analysis that (1) the FIRM will not be modified prior to approval, and (2) the FIRM could be adopted prior to implementation of the Project.

Impact of Yosemite Slough Bridge

Impact HY-13c **The Yosemite Slough bridge would not place structures within a 100-year flood hazard area or impede or redirect flood flows. (Less than Significant)** ***[Criterion M.h]***

The bridge across Yosemite Slough would not place structures within a SFHA that could generate high-velocity flood forces that could cause damage to the structure itself or adjacent structures. The Yosemite Slough bridge would be designed such that the superstructure would be well above the current 100-year flood hazard elevation in Zone V, to account for future sea level rise. Because the bridge would be designed to avoid potential impedance of flood flows, the impacts would be less than significant. No mitigation is required.

Combined Impact of Candlestick Point, Hunters Point Shipyard Phase II, and Yosemite Slough Bridge

Impact HY-13 **Implementation of the Project would not place structures within a 100-year flood hazard area or impede or redirect flood flows. (Less than Significant with Mitigation)** ***[Criterion M.h]***

As discussed in Impact HY-13a and Impact HY-13b, the preliminary FIRM for San Francisco indicates that development in portions of the Project site would occur in locations that are designated as Zone A. However, there are no designated floodways within this SFHA. Therefore, the impacts of impeding or redirecting flood flows in Zone A would be less than significant.

As discussed in Impact HY-13b, the Project would place structures within locations designated as Zone V on the preliminary FIRMs. Structures in Zone V could be subject to high-velocity flood forces that could cause damage to the structure itself or redirect flood flows into adjacent areas. There would be no buildings located in Zone V, and implementation of mitigation measure MM HY-12a.2 would require development setbacks and an adaptive strategy for future increases in sea level rise, which would protect the shoreline Zone V areas from the effects of high-velocity flood forces and reduce the impacts to a less-than-significant level.

As discussed in Impact HY-13c, the bridge would be designed to avoid potential impedance of flood flows, and the superstructure would be raised well above the current 100-year flood elevation. Therefore, the impacts would be less than significant.

Impact HY-14: Other Flood Risk

Impact HY-14 **Implementation of the Project would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. (Less than Significant with Mitigation)** ***[Criterion M.i]***

According to ABAG,[645] the Project site is adjacent to, but not within, the dam failure inundation zones from failure of the University Mound South Basin and/or North Basin reservoirs (refer to Figure III.M-3).

[645] Association of Bay Area Governments (ABAG). *Interactive ABAG (GIS) Maps Showing Dam Failure Inundation,* Website: http://www.abag.ca.gov/bayarea/eqmaps/damfailure/damfail.html, accessed on September 8, 2008.

The Project shoreline includes various features, such as concrete debris, unprotected embankments, pile-supported wharves, seawalls, and bulkheads that serve to protect the Project from flooding. Several of these features lack structural integrity and could fail suddenly, as the result of a large storm event or an earthquake, or gradually, through continued deterioration. Failure of these features could expose people or structures to flood hazards.

Mitigation measure MM HY-14 would require implementation of improvements recommended in Moffatt and Nichol's shoreline evaluation. In accordance with these recommendations, areas along the shoreline would be developed as open space, which would allow for implementation of additional flood control improvements, if necessary, in the case of a higher-than-planned sea level rise. The shoreline improvements would also reinforce the structural integrity of the existing shoreline, reducing the risk of sudden structural failure of deteriorated shoreline features. Such improvements would provide added protection against Project site flooding.

- *MM HY-14* *Shoreline Improvements to Reduce Flood Risk. To reduce the flood impacts of failure of existing shoreline structures, the Project Applicant shall implement shoreline improvements for flood control protection, as identified in the Candlestick Point/Hunters Point Development Project Proposed Shoreline Improvements report.[646] Where feasible, elements of living shorelines shall be incorporated into the shoreline protection improvement measures.*

Therefore, the risk of harm associated with dam failure would be less than significant.

Impact HY-15: Seiche, Tsunami, and Mudflows

Impact HY-15 **Implementation of the Project would not expose people or structures to inundation by seiche, tsunami, or mudflow. (Less than Significant) *[Criterion M.j]***

Tsunamis are large sea waves generated by submarine earthquakes, or similar large-scale, short-duration phenomena, such as volcanic eruptions, that can cause considerable damage to low-lying coastal areas. A substantial tsunami wave could affect areas of Project site adjacent to the coastline. Seiches are waves, also caused by large-scale, short-duration phenomena, which result from the oscillation of confined bodies of water (such as reservoirs, lakes, and bays) that also may damage low-lying adjacent areas, although not as severely as tsunamis. Mudflow hazards typically occur where unstable hillslopes are located above gradient, where site soils are unstable and subject to liquefaction, and when substantial rainfall saturates soils causing failure.

Inundation caused by a seiche would be triggered by seismic activity, tsunamis, or tides. Tidal records for the San Francisco Bay have been maintained for over 100 years, and during that time, a damaging seiche has not occurred. A seiche of approximately 4 inches occurred during the M8.3 1906 earthquake. It is probable an earthquake similar to the 1906 event would be the largest experienced in the Bay Area;[647] consequently a seiche larger than 4 inches is considered unlikely to occur. Finished grade elevations for the Project would protect the Project site from a seiche; therefore the impacts would be less than significant.

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646 Moffatt & Nichols, 2009, Candlestick Point / Hunters Point Redevelopment Project Proposed Shoreline Improvements, prepared for Lennar Urban, September, 2009.

647 Working Group On California Earthquake Probabilities, *Earthquake Probabilities in the San Francisco Bay Region: 2002–2031***,** United States Geological Survey Open-File Report 03-214, Appendix D. "Magnitude and Area Data for Strike Slip Earthquakes," Dr. William L. Ellsworth, Research Seismologist, USGS, 2003.

- The expected 100-year wave run-up height from a tsunami at the South Basin is -3.8 feet SFCD.[648] Even with a sea level rise of 3 feet, the 100-year wave run-up at South Basin would increase to -0.7 SFCD. The expected 100-year tsunami wave run-up at India Basin is -2.2 SFCD.[649] Accounting for sea level rise, 100-year wave run-up at India Basin would increase to +0.8 feet SFCD. Development finished grades, which account for sea level rise and 100-year flood elevations, would be over 1 foot above this potential tsunami wave run-up elevation. Therefore, the impacts from tsunami and seiche inundation would be less than significant. No mitigation is required.

Refer to the Section III.L for a discussion of the impacts related to mudflows and other types of landslides.

Cumulative Impacts

The geographic context for the analysis of hydrology and water quality cumulative impacts is often site-specific because each project site has a different set of physical considerations limiting development and construction. The following impacts identified for the Project are site-specific and would not contribute to impacts from other development projects: placement of housing in a 100-year flood hazard area, flooding in areas adjacent to the Bay, and exposure of people or structures to inundation by seiche, tsunami, mudflow, or dam failure. Some effects, however, particularly those pertaining to water quality, do have potential to contribute to impacts from other developments. Even when the pollutants and sediments generated by each individual project are minor, the additive effect of cumulative development in a watershed could have an adverse effect on the receiving waterbody. Because the extent of hydrology impacts can vary, the geographic context for each impact criterion is called out within the impact discussion.

With respect to cumulative effects on water quality associated with construction, all future development within the Islais Creek and Yosemite Basins would be required to conform to applicable WDRs, for example, the Construction General Permit, Wastewater Discharge Permit Order No. R2-2008-0007, and potentially General Permits Orders No. R2-2004-0055, R2-2006-0075, R2-2007-0033 (for certain types of construction dewatering). To obtain coverage under these permits, cumulative development projects would be required to implement construction BMPs similar to those recommended for the Project. Construction impacts on water quality would therefore be less than significant.

- Construction and operation of cumulative development would not deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. The groundwater basins underlying the Project site are not used for water supply; thus, the groundwater level has remained relatively constant over time. Although multiple dewatering projects within the groundwater basin could reduce the water table temporarily, this effect would be offset by infiltration. Thus, cumulative development would have a less-than-significant impact on groundwater recharge.

Construction activities would alter the drainage pattern of the various development sites within the Islais Creek and Yosemite Basins, as at the Project site. Over time, construction has substantially changed the

[648] Garcia, A.W. and Houston, J.R., 1975. *Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound*, United States Army Corps of Engineers Technical Report H-75-17, Figure 58, converted to SFCD.
[649] Garcia, A.W. and Houston, J.R., 1975. *Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound*, United States Army Corps of Engineers Technical Report H-75-17, Figure 58., converted to SFCD.

hydrology of San Francisco, resulting in localized changes, and in some cases, adverse effects such as flooding. The cumulative alteration of the drainage patterns of the watersheds would therefore be considered significant and adverse. However, the Project's contribution to this cumulative impact would not be considerable, because overall, the Project would not substantially change the existing drainage patterns at the Project site.

Both the construction and operation of cumulative development would have the potential to exceed the capacity of existing and planned storm sewers. As foreseeable development is constructed, the demand for conveyance capacity will increase. The SFPUC's Stormwater Sewer Master Plan is under development and is expected to address the need for additional sewer system capacity for planned future development through capital improvements. Individual projects may also be required to provide on-site treatment and retention capacity. Finally, the City's Green Building Ordinance requires treatment of 0.75 inch of stormwater runoff and a 25 percent reduction in runoff from the 2-year 24-hour storm event (the latter standard applies only to discharges to the combined sewer) compared to existing conditions (based on the LEED® standards). As a result of these planning efforts and policies, the cumulative impact on the capacity of existing and planned storm sewers would be less than significant.

- Cumulative development in the watershed, including development of the Yosemite Slough Restoration Project and at Executive Park, HPS Phase I, India Basin Shoreline, Jamestown, Brisbane Baylands, and Visitacion Valley, could contribute to violations of water quality standards or WDRs. The Lower Bay, the receiving waterbody, has noted impairments for chlordane, dichlro-diphenyl-trichloroethane (DDT), dieldrin, dioxin compounds, exotic species, furan compounds, mercury, and polychlorinated biphenyls (PCBs).[650] Additional development could exacerbate existing pollutant concentrations. However, future development in the watershed would likely use the combined sewer system infrastructure, provided it is in good condition. Therefore, these projects would need to follow SFPUC requirements for combined sewer areas once these requirements are developed. In addition, foreseeable development projects would be required to implement operational BMPs to control release of pollutants, similar to the Project. Therefore, the overall effect on water quality would be less than significant.

  Structures placed within an area subject to flooding can redirect flood flows, resulting in impacts on surrounding properties. Cumulative development surrounding the Project site could contribute to such an effect by erecting buildings and other structures within an area subject to inundation. However, it is anticipated that cumulative development in the floodplain would be subject to mitigation similar to that proposed for the Project and would be required to obtain Floodplain Development Permits from the City Administrator prior to buildout. To acquire such a permit, the project applicants for individual development projects must demonstrate that the proposed buildings or structures would not redirect flood flows such that an adverse physical effect would occur. Thus, cumulative impacts for this criterion would be less than significant.

[650] USEPA, 2007. 2006 CWA Section 303(d) List of Water Quality Limited Segments, June 28, 2007.

A dot (●) indicates material that has been revised since publication of the Draft EIR. Long changes are indicated with opening dots (❶) and closing dots (❶).

CANDLESTICK POINT–HUNTERS POINT SHIPYARD PHASE II DEVELOPMENT PLAN PROJECT

Final Environmental Impact Report

Volume III: Final EIR (Section III.N through Chapter VIII)
Administrative Draft 1

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SECTION III.N BIOLOGICAL RESOURCES

III.N.1 Introduction

This section of the EIR discusses existing biological resources within and surrounding the Project site and examines the potential for the Project to (1) result in substantial and adverse direct, indirect, or cumulative impacts to sensitive biological resources (including plants, wildlife, aquatic species, and vegetation communities); (2) interfere substantially with the movement of native fish or wildlife species; (3) conflict with local policies or ordinances protecting biological resources; or (4) conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. This section analyzes both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid any identified significant impacts.

Due to the length and complexity of this section, an overall description of the format and structure of the Biological Resources discussion, as well as the general approach to the analysis, is provided to assist the reader in following the discussion. First, while the boundaries of the Project site include the landside areas (i.e., those areas landward of tidal waters) that are depicted on Figure II-2 (Project Site and Context) of Chapter II (Project Description) of this EIR, the Project could result in impacts to aquatic resources that are located directly adjacent to the Project site (in the San Francisco Bay) as the result of the Project's various waterside improvements, including the shoreline improvements required to stabilize and/or reinforce the shoreline, improvements required to provide a marina, and construction of the Yosemite Slough bridge (refer to Appendix N2 [Yosemite Slough Bridge Drawing]). Therefore, this discussion focuses on both on-site landside and off-site aquatic resources.

The Study Area for this biological resources analysis includes both developed and undeveloped portions of HPS Phase II and Candlestick Point, including the entire Candlestick Point State Recreation Area (CPSRA), as well as off-site open waters adjacent to the Project site that would be impacted by Project components (i.e., breakwater, pier, etc.); refer to Figure III.N-1 (Biological Resources Study Area). The

- off-site aquatic resources discussed include Yosemite Slough (except the area of construction, which is included in the on-site impact analysis), the open water area between Candlestick Point and HPS Phase II (known as South Basin), and adjacent open waters that would be impacted by Project components (i.e., breakwaters, gangways, floats, etc.). For purposes of the evaluation of sensitive species, the Study Area is defined as the Project site and a radius of up to 5 miles beyond the Project site.

The Setting discussion describes existing biological conditions, consisting of common plant and wildlife species and habitats, sensitive plant and wildlife species and habitats, and wildlife movement/habitat connectivity conditions. The discussion was prepared by first completing an extensive literature search of potential biological resources within the Study Area, followed by completing several field surveys to document the conditions that do exist or could exist, depending on the time of year. The Setting discussion describes certain biological resources that are defined by state or federal regulations; therefore, detailed descriptions of applicable regulations are provided in the Regulatory Framework section.

SOURCE: HT Harvey, 2009; LSA Associates, 2004.

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FIGURE III.N-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

BIOLOGICAL RESOURCES STUDY AREA

The Impact discussion parallels the Setting discussion in presentation, first by discussing impacts to common species or resources and discussing sensitive species or resources. This section identifies both Project-specific and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts.

III.N.2 Setting

In order to assess existing conditions and potential Project-related impacts, PBS&J staff biologists conducted reconnaissance-level surveys of the Project site on August 9, 2007, May 5, 2008, and July 8, 2008. Surveys focused on identification of vegetation communities, special-status species or their potential habitat, and other biotic resources (i.e., potential wetlands or "other waters" of the US). During surveys, biologists walked transects through each habitat type while recording plant and wildlife species observed in field notes. On July 8, 2008, Navy personnel escorted a PBS&J staff biologist through HPS Phase II. The August 2007 and July 2008 surveys were in the dry season, when most annual, biennial, and perennial herbaceous plant species were dormant or had already died back, leaving only dried plant parts (i.e., leaves, stems, fruits) for identification. Lastly, a rare plant survey was conducted in May 2008. The survey was conducted by walking representative transects through the survey area while recording every plant species observed. Although the survey was conducted within the flowering window for the special-status species that could occur within the Project site, the unusually dry weather resulted in a shorter flowering period and thus, most annual, biennial, and perennial herbaceous plant species were dormant or had already died back for the growing season, leaving only dried plant parts (i.e., leaves, stems, fruits) for identification. If a plant species could not be identified in the field, diagnostic plant structures (i.e., fruits or morphology) were collected for further analysis. Some plants observed during the survey could only be identified to the Genus level.[651]

The "baseline conditions" for this analysis are based on these field surveys, other data collected or research conducted within the Study Area over the past six years (2003–2009), and federal and state agency information resources. Sources consulted include the California Department of Fish and Game's (CDFG) Natural Diversity Database (CNDDB) for the US Geological Survey's (USGS) 7.5-minute San Francisco South and Hunters Point quadrangles; the California Native Plant Society (CNPS) electronic inventory for the USGS 7.5-minute San Francisco South and Hunters Point quadrangles; the US Fish and Wildlife Service (USFWS) Endangered and Threatened Species list for the USGS 7.5-minute San Francisco South and Hunters Point quadrangles; the *Final Report Yosemite Slough Watershed Wildlife Survey*, LSA, July 2004; the *Final Draft Significant Natural Resource Areas Management Plan*, Sections 6.17 and 6.18, San Francisco Recreation And Park Department, February 2006; the *Draft Wetlands Mitigation and Monitoring Plan*, Navy Base Realignment and Closure Program, November 2006; the *Hunters Point Shipyard and Candlestick Point State Recreation Area, Natural Environment Study Report for the Bayview Transportation Improvements Project*, Jones & Stokes, June 2009; the *Final Delineation of Wetlands and Other Waters*, H.T. Harvey & Associates, Revised 13 July 2009 and October 13, 2009; the *Draft Sustainability Plan* for the Project, Arup North America Ltd, March 2009; PBS&J's *Candlestick Point/Hunters Point Shipyard Biological Technical Report* prepared for the San Francisco Redevelopment Agency (refer to Appendix N1 [Biological Resources Technical Report]), San Francisco Planning Department, December 11, 2008 updated November 2, 2009; and Project plans and graphic renderings.

[651] Plants that were identified to the Genus level are not special-status or rare plants, and, therefore, this taxonomic unit of classification does not affect the findings of this report.

- Information from these sources and from PBS&J's reconnaissance-level surveys was used to identify and characterize existing conditions at the Project site, and accordingly, were substantially relied upon for this analysis. In particular, LSA's Yosemite Slough Watershed Wildlife Survey (2004) and the Final Delineation of Wetlands and Other Waters conducted by H.T. Harvey & Associates (2009) provided specific information about the Study Area. LSA coordinated a wildlife survey of the Yosemite Slough Watershed between January 2003 and April 2004.[652] The survey of the Yosemite Slough Watershed included both the entire CPSRA and adjacent open water areas between HPS Phase II and the peninsula that forms the eastern extension of CPSRA.[653] From north to south, the Yosemite Slough Watershed Wildlife Survey Study Area is roughly bordered by Thomas Avenue, Ingalls Street, Carroll Avenue, Arelious Walkder Drive, Arelious Walker Drive, and the Hunters Point Expressway (Figure III.N-1). Although this survey covered only a portion of the Project site, it provides the most comprehensive data set available regarding the occurrence of wildlife in the area, and is thus cited heavily in the descriptions of existing conditions in this section. Also, because the majority of the Project site that was not covered by the Yosemite Slough Watershed Wildlife Survey is developed, we expect wildlife communities elsewhere on the Project site to be similar or depauperate in comparison to, those documented within the Yosemite Slough Survey's study area.

H.T. Harvey & Associates prepared a delineation of wetlands and other jurisdictional waters potentially meeting the regulatory definition of Waters of the United States within a majority of the Project site (February 2009 and revised on July 13 and October 13, 2009).[654] Surveys were conducted in 2008 on September 25 and 26; November 5 and 6; and December 4, 5, and 19; and in 2009 on January 29 and 30 and May 20. The delineation included the examination of the above-mentioned areas for wetlands using the routine determination method outlined in the US Army Corps of Engineers (USACE) Wetlands Delineation Manual. H.T. Harvey assessed topographic features, drainages, potential alterations to site hydrology, and areas of significant recent disturbance, and mapped the High Tide Line (HTL). The USACE verified the findings of the delineation with a Jurisdictional Determination dated August 31, 2009. As indicated on Figure III.N-3 (Wetlands and Other Waters) later in this section, the study area for H.T. Harvey's original wetland delineation did not included several limited areas that are now considered part of the Project site. As a result, H.T. Harvey expanded its original delineation by inspecting these additional areas in the field on October 8, 2009. H.T. Harvey & Associates has amended its wetland delineation report, and verification of jurisdictional boundaries in these additional areas by the USACE is pending.

Existing conditions are described with respect to observed plant species, vegetation communities, common aquatic habitats (i.e., mud flats, open water, and eelgrass (*Zostera marina*) beds), common wildlife (i.e., invertebrates, reptiles and amphibians, birds, and mammals), common aquatic resources (i.e., fish, shellfish, and mollusks), and sensitive species and habitats (sensitive plants, sensitive vegetation communities, sensitive wildlife [invertebrates, birds, terrestrial mammals, and marine mammals], and sensitive aquatic resources [mollusks, fish, and Essential Fish Habitat (see Sensitive Aquatic Resources)]).

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[652] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[653] Ibid.
[654] H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009 and October 13, 2009.

Observed Plant Species

As described in Appendix N1 to this EIR, a total of 187 vascular plant species were observed within the Project site during all of the biological surveys listed in the Setting section above, 103 of which are non-native. In addition, 66 of the non-native vascular plant species are considered to be invasive plant species.[655] Invasive plants are defined as those that were "moved by humans to another region." These invasive plants have a competitive advantage because they are no longer controlled by their natural predators, and can quickly spread out of control.[656] Widely scattered trees are present and appear to either be horticultural plantings associated with landscaping or represent locally naturalized specimens. Calflora's on-line Plant Name Library was used for the scientific nomenclature for plant names in this section.[657]

Vegetation Communities

For purposes of the biological resources analysis, the Study Area is first described in terms of the vegetation communities it supports, as reflected by Table III.N-1 (Vegetation Communities within the Study Area) and further discussed below. The vegetation communities are defined according to CDFG's Vegetation Classification and Mapping Program of the Biogeographic Data Branch,[658] H.T. Harvey & Associates' wetland delineation for HPS Phase II and Candlestick Point,[659] and PBS&J's Biological Technical Report prepared for the Project.[660]

As depicted in Figure III.N-2 (Study Area Habitats), the Study Area contains four non-aquatic vegetation communities: non-native annual grassland, landscaped areas/ornamental plants, salt marsh, and seasonal freshwater wetland. In addition, approximately 568.80 acres of the Study Area is "urban." This habitat is not classified as a "vegetation community" and is thus not included in the "vegetation communities" table. Urban habitat includes developed or paved areas. The Study Area also contains three aquatic habitats: mud flats, eelgrass beds, and open waters. Table III.N-1 provides the total acreages of each vegetation community within the Study Area. A description of each of the vegetation communities follows this table.

In some cases, vegetation communities may also be considered sensitive vegetation communities. In those cases, and there are three such cases in this analysis, they are also discussed under Sensitive Vegetation Communities, which follows this discussion. The three sensitive communities within the Study Area include salt marsh, eelgrass beds, and seasonal freshwater wetland habitats (also discussed under Sensitive Vegetation Communities).

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[655] California Invasive Plant Council (Cal-IPC) Invasive plant definitions 2009. Website: http://www.cal-ipc.org/ip/definitions/index.php. Accessed July 2009.
[656] California Invasive Plant Council (Cal-IPC) Invasive plant definitions 2009. Website: http://www.cal-ipc.org/ip/definitions/index.php. Accessed July 2009.
[657] Calflora, 2009. Website: http://www.calflora.org/index.html. Accessed July 2009.
[658] California Department of Fish and Game (CDFG), *The Vegetation Classification and Mapping Program: List of Terrestrial Natural Communities Recognized by the California Natural Diversity Database,* Sacramento, California, September 2003 edition.
[659] H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009 and October 13, 2009.
[660] PBS&J, *Candlestick Point/Hunters Point Shipyard Project Biological Technical Report,* prepared for the San Francisco Redevelopment Agency, San Francisco Planning Department, December 11, 2008 updated November 2, 2009.

Table III.N-1 Vegetation Communities within the Study Area

Habitat Type	*Candlestick Point*	*Hunters Point Shipyard*	*Yosemite Slough*	*Total Acreage*
Non-native Annual Grassland[a]	30.53	44.19	—	74.72
Landscaped Areas/Ornamental Plants[a]	44.67	—	—	44.67
Salt Marsh[b]	0.93	3.56	0.06	4.55
Seasonal Freshwater Wetland[b]	—	0.20		0.20
Mud Flats/ Open Water*	21.82	169.29	4.43	195.54
Totals	***97.95***	***217.24***	***4.49***	***319.68***

SOURCES:

a. PBS&J, *Bayview Waterfront Project Biological Technical Report* prepared for the San Francisco Redevelopment Agency, San Francisco Planning Department, December 11, 2008 updated November 2, 2009, which is provided as Appendix N1 to this EIR.

b. H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters, San Francisco, California*, February 2009 and revised July 13 and October 13, 2009.

Acreage discrepancies between the data contained herein and the total approximate acreage of the Study Area are due to the conversion of data from non-GIS to GIS data.

This table does not include the acreage for developed/urban areas (568.80 acres) because this classification is not a recognized vegetation community for purposes of this EIR.

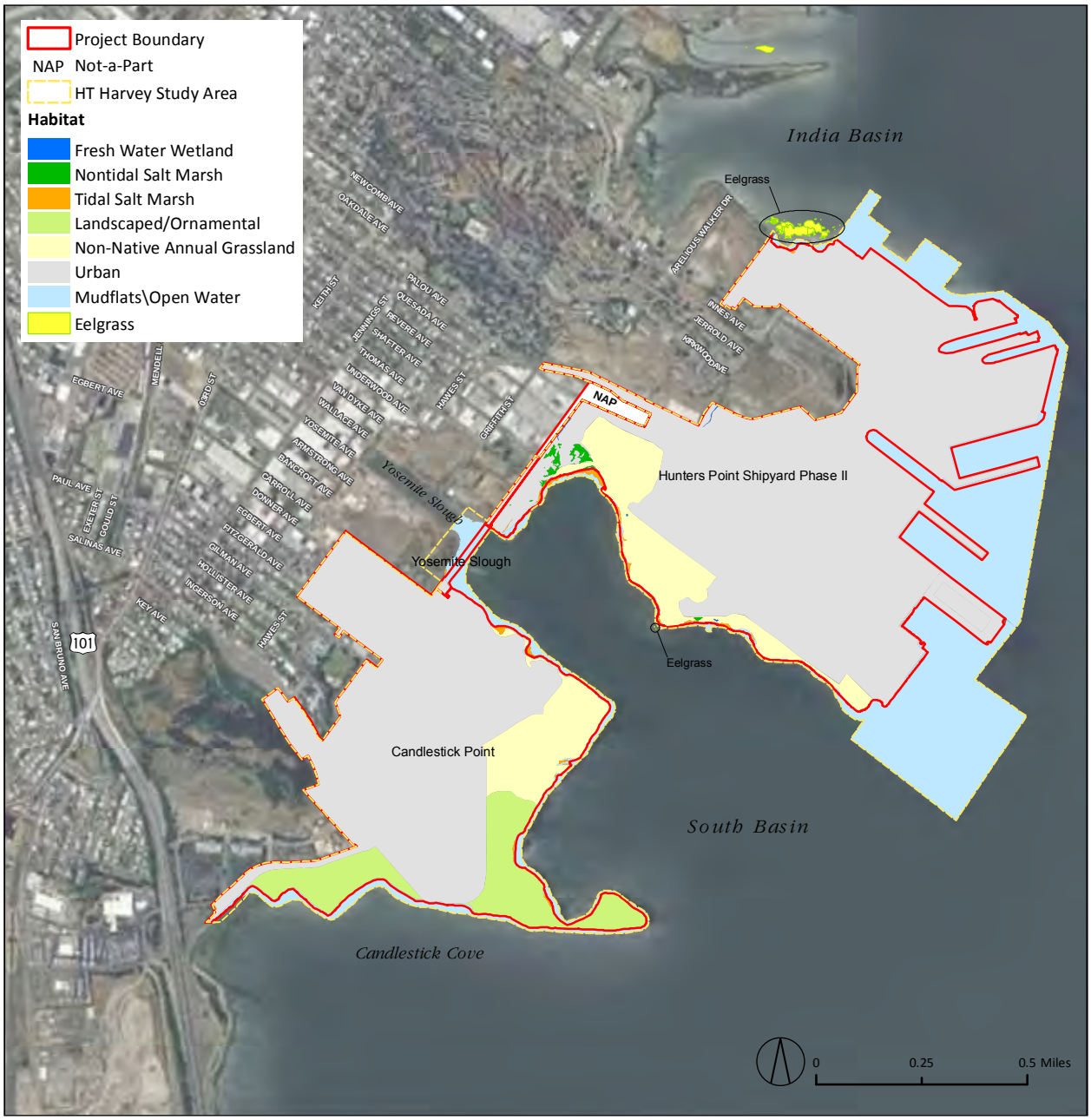
* The open waters located outside of the Project boundary include those adjacent to Candlestick Point, Hunters Point Shipyard, and Yosemite Slough.

Non-native Annual Grassland

Patches of non-native annual grassland habitat are found throughout the Project site and comprise 74.72 acres. Invasive, non-native grasses characterize this community, particularly at HPS Phase II due to the intensive disturbance associated with the Navy's ongoing remediation efforts. The vegetation within this grassland consists of a mixture of invasive annuals such as wild oat (*Avena fatua*), rip-gut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), rat-tail fescue (*Vulpia myuros*), and hare barley (*Hordeum murinum var. leporinum*). Broad-leaf species occurring within the grasslands consist of wild radish (*Raphanus sativus*), painted charlock (*R. raphanistrum*), black mustard (*Brassica nigra*), Mediterranean linseed (*Bellardia trixago*), cut-leaf plantain (*Plantago coronopus*), spring vetch (*Vicia sativa*), red valerian (*Centranthus ruber*), and Italian thistle (*Carduus pycnocephalus*). Additionally, garland chrysanthemum (*Chrysanthemum coronarium*) has naturalized across much of the grasslands and showy stands of these flowers are present throughout the entire CPSRA.

Small distinct colonies of native perennial bunch grasses grow in a few areas at HPS Phase II. Clusters of single species or a combination of species including purple needle grass (*Nassella pulchra*), blue wild rye (*Elymus glaucus*), and red fescue (*Festuca rubra*) grow sporadically throughout the Project site. These small isolated occurrences of native grasses are not large enough to warrant identification as a separate vegetation community.

Portions of the Study Area, including uplands along Yosemite Slough, include ruderal vegetation such as fennel (*Foeniculum vulgare*) intermixed with non-native grasses such as wild oats and Italian rye (*Lolium multiflorum*). Shrubs, mainly coyote brush (*Baccharis pilularis*), are scattered throughout the upland surrounding Yosemite Slough area.



SOURCE: Caltrans, Biological Assessment for the Bayview Transportation Improvements Project, Jones and Stokes, July 2007. Golden Gate Audubon Society, Final Report Yosemite Slough Watershed Wildlife Survey, H.T. Harvey & Associates, Hunters Point Shipyard and Candlestick Point State Recreation Areas Final Delineation of Wetlands and other Waters, February 2009 and revised July 2009. LSA, July 2004, PBS&J Field Survey, August 2007 and May 2008, Merkel and Associates, 2003 SF Bay eelgrass survey.

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FIGURE III.N-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

STUDY AREA HABITATS

Landscaped Areas/Ornamental Plants

Landscaped areas make up about 44.67 acres of Candlestick Point and include areas landscaped with native and non-native ornamental shrubs and trees, particularly near the walking paths along the shoreline of Candlestick Point. A tree survey[661] (provided in Appendix N4) was conducted for the Project within all of the Project site except the portion of CPSRA that is not subject to the land transfer and is not expected to be substantially modified. This survey identified trees primarily in areas mapped as "Landscaped/Ornamental", "Urban", and "Non-Native Annual Grassland" on Figure III.N-2. For the purpose of this survey, a "tree" was defined as any stem of a woody plant with a tree-like (as opposed to shrubby) growth habit measuring at least 2 inches in diameter at a height of 4.5 feet above the ground. As a result, single trees with multiple stems measuring at least 2 inches in diameter were represented as multiple "trees," and the high number of trees recorded during this survey was driven largely by such multi-stemmed individuals. The tree survey recorded approximately 1,976 tree stems at least 2 inches in diameter on 1,068 individual plants on Candlestick Point and 854 tree stems at least 2 inches in diameter on 328 individual plants on HPS Phase II.

On Candlestick Point, the vast majority of these trees consisted of multi-stemmed lollypop trees (*Myoporum laetum*); eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and olives (*Olea europeaea*) were also well represented on Candlestick Point. All four of these species are non-natives. The most common native trees on Candlestick Point are California live oak (*Quercus agrifolia*), flannel bush (*Fremontodendron californicum*), and California buckeye (*Aesculus californica*). Monterey pine (*Pinus radiata*) and ornamental cypress (*Cupressus* spp.) are also common, although neither is native to San Francisco. There are several specimens of the native California bay (*Umbellularia californica*) and blue elderberry (*Sambucus nigra* ssp. *caerulea*) as well. Non-native, ornamental lollypop trees (*Myoporum laetum*) grow along the northwestern edge of Candlestick Point, and Australian tea trees (*Leptospermum laevigatum*) are scattered along the trails of the CPSRA. Native shrubs include coyote bush, ornamental buckbrush (*Ceanothus* spp.), firethorn (*Pyracantha* spp.), coffeeberry (*Rhamnus californica*), hummingbird sage (*Salvia spathacea*), and black sage (*S. mellifera*) which grow along the paths in clusters that are a combination of planted and volunteer specimens. Non-native evergreen shrubs such as rockrose (*Cistus* spp.) are common throughout the Project site and in some locations have naturalized.[662]

On HPS Phase II, trees recorded during the tree survey were dominated by small, multi-stemmed toyon (*Heteromeles arbutifolia*; a native species, though the trees on HPS appear to be of an ornamental variety) and several non-natives, including London planetree (*Platanus* x *acerifolia*) and acacia (*Acacia* spp.).

Salt Marsh

Salt marsh habitat forms along the margins of estuaries and bays whose shorelines are shallow and protected. In the Study Area, it totals approximately 4.50 acres on site and 0.05 acre in areas of off-site (i.e., areas of Yosemite Slough outside of the Project boundary) Project work.[663] It occurs in limited areas along the shoreline where riprap does not extend to the waterline and prohibit the growth of vegetation, and in several nontidal areas in the southwestern portion of HPS. Narrow patches of salt marsh habitat, varying

[661] H.T. Harvey & Associates, *Candlestick Point/Hunters Point Shipyard Tree Survey*. October 16, 2009.
[662] Naturalized plants are those that were originally installed as ornamental plantings but are now found growing 'naturally' in a variety of habitats.
[663] H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009 and October 13, 2009.

in length from 20 to 100 feet, occur sporadically along the shoreline of the Project site, and throughout Yosemite Slough.[664]

Salt marshes are often subject to tidal influences, and species composition of tidal salt marsh vegetation varies along gradients based on elevation. The amount of time an area is inundated determines the primary species of plants found there. The highest elevations typically support almost pure stands of pickleweed (*Salicornia virginica*), which also dominates the patches of nontidal salt marsh on HPS. Associated species that occur in the zone around the high tide elevation include salt grass (*Distichlis spicata*), European sea rocket (*Cakile maritima*), coastal gumweed (*Grindelia stricta*), and sea lavender (*Limonium californicum*). Slightly lower areas above the Mean High Water (MHW) elevation support cord grass (*Spartina* spp.). In the area above the HTL, common iceplant (*Carpobrotus edulis*) grows in some locations, carpeting the upland margins in a dense monoculture. The low growing shrub silver beach bur (*Ambrosia chamissonis*) also grows in the upland areas along the shoreline.

Seasonal Freshwater Wetland

Seasonal freshwater wetland habitat occupies 0.20 acre in two linear features at the southern and west-central margins of HPS Phase II. These wetlands are characterized by the presence of annual wetland grasses and forbs in depressions that hold water for a short to medium duration during the rainy season. One of these wetlands, in the southwestern portion of HPS Phase II, consists of pools that are shallow basins that lack drainage outlets. Seasonal water inundation in these pools creates a condition favoring hydrophytic (water-loving) plants such as spearscale (*Atriplex triangularis*), salt grass, bird's-foot trefoil (*Lotus corniculatus*), prickly ox-tongue (*Picris echioides*), saltmarsh bulrush (*Bolboschoenus robustus*), Italian ryegrass (*Lolium multiflorum*), rabbit's foot grass (*Polypogon monspeliensis*), and willow dock (*Rumex salicifolius*), as observed in HPS Phase II.[665] The second seasonal freshwater wetland, in the west-central part of HPS Phase II, consists of a narrow swale/ditch that is apparently fed by groundwater seepage.

Common Aquatic Habitats

Mud Flats

Mud flats are the broad expanses of the San Francisco Bay bottom that are exposed during low tides. These areas are comprised of very soft sediments and do not support any vegetation other than eelgrass beds, which may occur within mud flats. Mud flats are an important habitat because they support a vast array of crustaceans, worms, and other invertebrates that are important food sources for resident and migratory shorebirds and waterfowl. Mud flats are exposed at low tides once or twice a day along the shore south of CPSRA and along the shorelines of Yosemite Slough and South Basin. These mud flats are relatively limited in extent compared to the vast mud flats present in other parts of San Francisco Bay, and as a result, numbers of shorebirds using these mud flats are low except for occasional, brief migratory pulses of birds.

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[664] H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009 and October 13, 2009.
[665] PBS&J, *Candlestick Point/Hunters Point Shipyard Project Biological Technical Report*, Prepared for San Francisco Redevelopment Agency and San Francisco Planning Department, 2009, which is provided as Appendix N1 to this EIR.

Open Water (San Francisco Bay)

San Francisco Bay (also referred to as "the Bay" in this section) is the largest estuary on the California Coast, covering between 400 and 1,600 square miles depending on which bays are included.[666] Fresh water enters primarily through the Sacramento-San Joaquin Delta and mixes with seawater that enters via the Golden Gate. Tidal action and freshwater runoff determine the salinity of the Bay. For the purpose of this assessment, the term "open water" refers to unvegetated tidal areas located below the MHW elevation, which in this area is approximately 5.87 feet relative to the North American Vertical Datum of 1988 (NAVD88)[667] or 11.80 relative to the San Francisco City Datum (SFCD).[668] This is the same area regulated by the USACE under Section 10 of the *Rivers and Harbors Act*. These areas are subject to the normal ebb and flood of the tide. For example, mud flat habitats described above are a subset of open water aquatic habitats since these areas are inundated for at least half the tidal cycle; for this reason, acreages of mud flat and open water habitats are not distinguished in Table III.N-1. Open water habitats support an array of relatively common estuarine/marine species from encrusting tunicates, sponges, and algae to bottom-dwelling fish such as the Pacific halibut (*Hippoglossus stenolepis*), flounder, and sole, to more open water fish such as the Pacific herring (*Clupea pallasi*), Pacific sardine (*Sardinops sagax*), and anchovies (*Anchoa* spp.). The on-site open waters are those nearshore areas below the MHW elevation where Project work could occur (i.e., sea wall enhancements and marina improvements). Off-site open waters within a 5-mile radius of the Project site were also considered for their potential to support sensitive species (as described under "Sensitive Species and Habitats" below). These areas are considered here because most of the sensitive species potentially occurring there have the ability to move to and from the Study Area at any time.

Eelgrass Beds

Eelgrass is an aquatic plant found on soft mud-bottom bays and estuaries along the Pacific coast. It occurs in both subtidal and intertidal areas of San Francisco Bay and approximately 1.99 acres of it occur within the Study Area.[669] Eelgrass beds are considered a sensitive resource and, therefore, are discussed in detail under Sensitive Species and Habitats.[670]

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666 The Bay Institute, *About the Bay*. 2008. Website: http://www.bay.org/about_the_bay.htm. Accessed October 28, 2008.

667 H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009 and October 13, 2009.

668 San Francisco City Datum (SFCD) is a local vertical geodetic reference system specific to the City and County of San Francisco and formally established in 1964 as 8.616 feet above the National Geodetic Vertical Datum of 1929 (NGVD29), making it about 8.13 feet above mean sea level. The North American Vertical Datum was established in 1988 (NAVD88) and generally has replaced NGVD29 as a standard reference. Elevations expressed in NGVD29 may be converted to NAVD88 by adding 2.69 feet.

669 California Department of Fish and Game (CDFG), *The Vegetation Classification and Mapping Program: List of Terrestrial Natural Communities Recognized by the California Natural Diversity Database,* Wildlife and Habitat Data Analysis Branch, Sacramento, California, September 2003 edition.

670 California Department of Fish and Game (CDFG), *The Vegetation Classification and Mapping Program: List of Terrestrial Natural Communities Recognized by the California Natural Diversity Database,* Wildlife and Habitat Data Analysis Branch, Sacramento, California, September 2003 edition.

Common Wildlife

Invertebrates

Fourteen butterfly species were observed during the Yosemite Slough Watershed Wildlife Survey.[671] Common butterflies observed during that survey included cabbage whites (*Pieris rapae*), anise swallowtails (*Papilio zelicaon*), and common checkered skippers (*Pyrgus communis*). Other butterflies observed include mustard white (*Pieris napi*), orange sulphur (*Colias eurytheme*), California hairstreak (*Satyrium californicum*), gray hairstreak (*Strymon melinus*), western pygmy-blue (*Brephidium exile*), spring azure (*Celastrina ladon*), west coast lady (*Vanessa annabella*), red admiral (*Vanessa atalanta*), common buckeye (*Junonia coenia*), and common ringlet (*Coenonympha tullia*), and monarch butterfly (*Danaus plexippus*). Numerous other invertebrate species, including insects, crustaceans, worms, and other taxa, occur on the site as well.

Reptiles and Amphibians

The Yosemite Slough Watershed Wildlife Survey recorded three snake species, two lizard species, and one amphibian.[672] Reptiles and amphibians observed included California slender salamander (*Batrachoseps attenuatus*), southern alligator lizard (*Elgaria multicarinata*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), ring-necked snake (*Diadophis punctatus*), and western garter snake (*Thamnophis elegans*). The western fence lizard, California slender salamander, and southern alligator lizard were found in relatively high numbers, with survey maxima (i.e., the maximum number of individuals observed on a single survey) of 49, 43, and 21 individuals, respectively. However, the other species were represented by few individuals, suggesting that populations of these other species are sparse in the area.

Amphibians had the lowest diversity within the Yosemite Slough Watershed Survey area, with only one species observed (the California slender salamander).[673] The California slender salamander frequents grassland, chaparral, woodland, forest, and yards and vacant lots in some suburban areas. It takes refuge under logs, boards, bark, and in damp leaf litter and rotting logs. It lays its eggs in late fall and winter, often in communal nests.[674] The San Francisco Bay and the small seasonal wetlands on the site do not provide suitable aquatic habitat for amphibians, primarily due to high salinity. The few freshwater habitats on or near the Project site do not provide breeding habitat for amphibians such as frogs or toads, likely because of their very shallow and/or ephemeral nature.[675]

Reptiles also appeared to have relatively low diversity, with only five species observed. The abandoned fields, extensive debris (providing cover), and presence of prey (i.e., mice, invertebrates, salamanders) provide suitable habitat for these five species.[676] The upland areas, dominated by disturbed vegetation and non-native grassland, support the snake and lizard species.[677]

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671 Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
672 Ibid.
673 Ibid.
674 Stebbins, R., Peterson, *Field Guides: Western Reptiles and Amphibians*, Houghton Mifflin Company, 1966.
675 Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
676 Ibid.
677 Ibid.

During one survey, 21 southern alligator lizards were observed in silvery beachweed along the shoreline of the South Basin (refer to Map 2 of the Yosemite Slough Watershed Wildlife Survey for a graphic representation of the location of the South Basin).[678] The lizards were all juveniles and may have been from a single clutch that had been laid in the silvery beachweed.[679]

Although the Yosemite Slough Watershed Wildlife Survey covered only Candlestick Point and the southern shoreline of HPS Phase II, it is expected that a lower abundance of these common reptile and amphibian species would be found within the disturbed areas within HPS Phase II than at Candlestick Point. Recent, intensive disturbance due to ongoing remediation activities has undoubtedly reduced populations of these species on HPS Phase II. A few individuals of these reptiles and amphibians may occur within the developed portions of the Project site, which represents approximately 80 percent of the overall acreage of the site, but numbers are expected to be very low in such low-quality habitat.

Birds

One hundred and eighteen bird species (which are named herein according to the American Ornithologists' Union Checklist of North American Birds[680] except for sensitive subspecies recognized by CDFG or USFWS) were observed during the Yosemite Slough Watershed Wildlife Survey.[681] Of these, 51 species were represented by a maximum count of five or fewer individuals, indicating that, for many bird species, the site is used by relatively low numbers of individuals.[682] The majority of the species observed were terrestrial species, followed by shorebirds, waterfowl, gulls and terns, and raptors (in descending order). Terrestrial habitats supported large numbers of some common bird species such as white-crowned sparrows (*Zonotrichia leucophrys*), western meadowlarks (*Sturnella neglecta*), and house finches (*Carpodacus mexicanus*). The landbirds that are most abundant on the site are those associated with the weedy, ruderal habitats dominating the Project site and those tolerant of the urbanization and associated disturbance resulting from the site's location. In contrast, very few Neotropical and other long-distance migrant songbirds were recorded during this study. Studies have documented that bird species diversity is closely associated with structural habitat complexity. Bird species diversity (a measure of the number of species in a given area) increases with increasing foliage height diversity (a measure of the number and diversity of vertical layers of vegetation in that area).[683,684] While this has been best studied in breeding birds, the structural complexity of habitat also influences the degree to which an area provides resources to migrant birds. Multi-layered vegetation, with well-developed ground, understory, and canopy layers, would support greater diversity of migrants than the structurally simple vegetation that dominates most of Candlestick Point and HPS Phase II. Also, breeding bird abundance is often closely associated with the density or volume of vegetation, with increasingly dense vegetation supporting more individual birds[685]. The sparse

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678 Ibid.
679 Ibid.
680 American Ornithologists' Union (AOU), *Check-list of North American Birds (1998)* through Forty-ninth Supplement, July 2008.
681 Ibid.
682 Ibid.
683 MacArthur, R. H. and J. W. MacArthur. 1961. On bird species diversity. Ecology 42:594-598.
684 Karr, J. R. 1968. Habitat and avian diversity on strip-mined land in east-central Illinois. Condor 70:348-357.
685 Mills, G. S., J. B. Dunning, Jr., and J. M. Bates. 1991. The relationship between breeding bird density and vegetation volume. Wilson Bulletin 103:468-479.

vegetation present on most of the Project site limits the value of the site to breeding and migratory birds. Numbers and diversity of landbirds on HPS Phase II are likely lower than on Candlestick Point owing to the recent, intensive disturbance and even lower abundance of trees and shrubs on HPS Phase II.

The waters of the South Basin and the Bay surrounding the Study Area are used by a variety of waterbirds, some of which are fairly abundant. Common waterbirds observed in these waters include double-crested cormorant (*Phalacrocorax auritus*), California gull (*Larus californicus*), greater scaup (*Aythya affinis*), ruddy duck (*Oxyura jamaicensis*), surf scoter (*Melanitta perspicillata*), and bufflehead (*Bucephala albeola*). While these birds forage primarily or solely in aquatic habitats, some species, such as cormorants, California brown pelicans (*Pelecanus occidentalis californicus*), gulls, and possibly terns roost in large numbers on piers on HPS Phase II. Small numbers (fewer than 10 pairs) of western gulls (*Larus occidentalis*) nest on two rocks in South Basin known as Double Rock. Shorebirds such as the western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), and dunlin (*Calidris alpina*) forage on intertidal mud flats and along the shoreline of Candlestick Point and the southern part of HPS Phase II, typically in low numbers but occasionally in higher numbers when migratory pulses of shorebirds are present in the Bay. The majority of the Study Area is developed or urbanized and supports relatively few species of birds.

In addition to the 118 bird species recorded during the Yosemite Slough Watershed Wildlife Survey, that survey's report listed an additional 36 species that had been recorded by a local birder, Mr. Alan Hopkins, over the past 20 years.[686]

Mammals

The most abundant mammal observed during the Yosemite Slough Watershed Wildlife Survey was the California ground squirrel (*Spermophilus beecheyi*). This species was observed along the shoreline and riprap areas of HPS Phase II and Candlestick Point, as well as in grassland and ruderal habitats and under trees and shrubs on Candlestick Point. The substrate along the shoreline is composed mostly of small rubble such as broken bricks that had been used as fill. Riprap composed of large rocks was placed along exposed sections of the shoreline, providing refugia for small mammals.[687] Other mammals observed during the survey included feral domestic cat (*Felis silvestris*), feral domestic dog (*Canis familiaris*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), harbor seal (*Phoca vitulina*), black-tailed jackrabbit (*Lepus californicus*), Botta's pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), and Norway rat (*Rattus norvegicus*). Of the 10 species recorded by the LSA study, three are non-natives (domestic dog, domestic cat, and Norway rat); two are common urban-adapted species (raccoon and striped skunk); and one occurs infrequently in aquatic areas (harbor seal). Of the remaining four species, the Botta's pocket gopher and California vole were represented by no more than one individual on a given survey and thus may be uncommon on the site. As mentioned for reptiles and amphibians above, mammal diversity and abundance on HPS Phase II are expected to be lower than on Candlestick Point, as recent, intensive disturbance by remediation activities has likely reduced mammal populations there. The shorelines, vacant lots, and undeveloped ruderal/non-native grassland areas of HPS Phase II and CPSRA are surrounded by urban and industrial

[686] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[687] Ibid.

development, which limits the potential for dispersal of mammals in and out of the site. There are no CNDDB reports of the occurrence of any special-status mammal species in the Study Area.

Common Aquatic Resources

Fish, Crabs, and Mollusks

San Francisco Bay supports a diverse assemblage of fish species. These vary from resident fish such as assorted flat fish (flounder and sole) to a variety of rockfish (*Sebastes* spp.) and to migratory species such as Pacific herring, Pacific sardines, anchovies, and salmonids (*Oncorhynchus* spp.) which spend varying portions of their life cycle in the Bay. Estuaries provide important spawning habitat for fish and the San Francisco Bay is no exception. Pacific herring spawn in the Bay and support a small commercial fishery. Other fish for which adults spawn in the Bay include flounder, sole, and Pacific halibut. Juvenile sturgeon (*Acipenser* spp.) rear in the Bay for an undetermined length of time before moving to the ocean.

Shellfish found in the Bay and within the vicinity of the Study Area include Dungeness crab (*Cancer magister*), other rock crab, and shrimp. Dungeness are the target of an important commercial fishery in the open ocean and the Bay is important rearing habitat for young crab. Crab hatch in the Gulf of the Farallones and after several larval stages, migrate into the Bay and rear primarily in San Pablo and Suisun bays,[688] over 20 miles north of the Study Area.

The Bay also supports a variety of mollusks. These include native clams, mussels, oysters, and snails (gastropods). Some of these are native (i.e., bent-nosed macoma [*Macoma nasuta*], Olympia oyster [*Ostrea conchaphila*], and limpets [*Acmaea* spp.]) while others have been introduced either intentionally such as the Atlantic oyster (*Crassostrea virginica*) or unintentionally such as overbite clam (a.k.a. Asian clam; *Corbula amurensis*). Many of the clams use soft-bottom sediments and could be found on the seafloor near the Project site. Most oysters require a solid substrate for attachment. Suitable habitat for oysters and mussels is found throughout the Study Area on bulkheads, pilings, and riprap associated with the shoreline.

In addition to the native fish and shellfish, the Bay supports a vast array of introduced species. Most of these have been introduced in ballast water of trans-Pacific traveling cargo ships. Species suspected of being ballast water introductions include Chinese mitten crab (*Eriocheir sinensis*), yellowfin goby (*Acanthogobius flavimanus*), and overbite clam. Other species, including striped bass (*Morone saxatilis*) and American shad (*Alosa sapidissima*), have been introduced to support sport fisheries. The complex interaction between introduced and native species within the Bay continues to be the topic of much debate and study.

The open water of the Study Area is part of or directly connected to the Bay and all of the Bay fish species can move freely into and out of the Study Area at any time. Because of this, the species assemblage within and adjacent to the Project site is expected to be representative of the central Bay as a whole.

The portion of the San Francisco Bay immediately adjacent to the Project site has been highly modified over the years to support commercial shipping, industrial uses, and US Naval activities, and virtually the entire shoreline of the Study Area is composed of fill of various kinds. As a result, the shorelines are almost

[688] California Department of Fish and Game (CDFG), 2009. Dungeness crabs (*Cancer magister*). Website: http://www.delta.dfg.ca.gov/baydelta/monitoring/cmag.asp. Accessed July 16, 2009.

exclusively comprised of bulkheads and riprap. Dredging of shipping channels has occurred within the nearshore areas. All of these actions have combined to reduce the aquatic habitat complexity. Reductions in habitat complexity reduce the number of species that routinely utilize a particular area,[689] and, therefore, the numbers of resident fish species within the Study Area are expected to be similar to other developed areas of the Bay.

Marine Mammals

The most common marine mammals within San Francisco Bay are harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*), both of which are protected under the *Marine Mammal Protection Act*. The *Marine Mammal Protection Act* does not bestow a particular status designation for the species it protects, which is similar to the *Migratory Bird Treaty Act*. Instead, the *Marine Mammal Protection Act* and the *Migratory Bird Treaty Act* equally protect all marine mammals and native birds, respectively.

Harbor Seal (*Phoca vitulina*)

Harbor seals are year-round residents found throughout the Bay. They use haulouts scattered through the Bay to bask, rest, and use as pupping sites. The most frequently used pupping sites are in the North (Castro Rocks) and South bays (Mowry Slough); both sites are over 15 miles from the Study Area. Pupping season begins in late March and peaks in early May.[690] The closest haulout site is on Yerba Buena Island, about 6 miles from the Project site.[691] There are no known haulout locations within the Study Area. During the 2003–2004 Yosemite Slough Watershed Wildlife Survey, LSA observed nine harbor seals in the outer South Basin (open water between Candlestick Point and HPS Phase II); however, no haulouts were detected during the survey.[692] No harbor seals or haulouts were observed during surveys by PBS&J biologists for this Project.

California Sea Lion (*Zalophus californianus*)

California sea lions do not breed in the Bay, preferring offshore islands such as the Channel Islands near Santa Barbara or the Farallon Islands, but sea lions forage and rest at various locations around the San Francisco Peninsula.[693] They are relatively social animals, frequently seen basking or foraging in large groups. On May 2, 2003, a total of ten sea lions were observed hauled out on a flat, floating structure in the outer South Basin.[694] Sea lions may occur in the Study Area, but the site does not support any known haulout locations.

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[689] Moyle, P.B. *Inland Fishes of California, 2nd Edition*, University of California Press.
[690] Richmond Bay Bridge Harbor Seal Team. No date. Harbor Seal. Website:
http://userwww.sfsu.edu/~halmark/educati.htm. Accessed October 31, 2008.
[691] San Francisco State University. No date. *Richmond Bridge Harbor Seal Survey Site Map*. Website:
http://userwww.sfsu.edu/~halmark/map.htm. Accessed October 31, 2008.
[692] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27 2004.
[693] Marine Mammal Center 2002. *California Sea Lion information sheet*. Website:
http://www.marinemammalcenter.org/learning/education/pinnipeds/casealion.asp. Accessed October 31, 2008.
[694] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27 2004.

Sensitive Species and Habitats

The potential for special-status plant and wildlife species to occur within the Study Area was determined by assessing habitat suitability information collected during biological reconnaissance surveys conducted in August 2007 and July 2008, a rare plant survey conducted in May 2008, and a review of the CNDDB, CNPS Inventories, and USFWS databases, as previously described. In addition, approximately 29 wildlife surveys were conducted in the vicinity of Yosemite Slough between January 2003 and April 2004 (in association with the Yosemite Slough Watershed Wildlife Survey), and that survey's report included a list of additional bird species that had been observed by Mr. Alan Hopkins over the past 20 years.[695] The list of potentially occurring special-status species provided in Table III.N-5 (Special-Status Species Potentially Occurring within the Study Area) is informed by all of these sources, as well as a search of known sensitive species occurrences within a 5-mile radius of the Project site, as shown in Figure 3 (Special-Status Species Occurrences within 5-Mile Radius) in Appendix N1 to this EIR. *(Note: Table III.N-5 is provided at the end of this section due to its length.)*

Special-status species are defined as follows:

- Species listed, proposed, or candidate for listing as Threatened or Endangered by the USFWS pursuant to the federal *Endangered Species Act of 1973* (FESA), as amended
- Species designated by the USFWS as Species of Conservation Concern
- Species designated by the National Marine Fisheries Service (NMFS) as Species of Special Concern
- Species listed as Rare, Threatened, or Endangered by the CDFG pursuant to the *California Endangered Species Act of 1984* (CESA), as amended
- Species designated as Fully Protected under Sections 3511 (birds), 4700 (mammals), and 5050 (reptiles and amphibians) of the *California Fish and Game Code*
- Species designated by the CDFG as California Species of Special Concern
- Plant species listed as Category 1B and 2 by the CNPS; CNPS Category 3 and 4 species were not considered special-status species for the sake of this assessment, as they are not considered sufficiently rare on a regional level to warrant such status, though no such plants were recorded in the Study Area.
- Species not currently protected by statute or regulation, but considered rare, threatened or endangered under Section 15380 of the CEQA Guidelines (such as the Olympia oyster and Pacific herring)

Table III.N-5 identifies the special-status plant and wildlife species that have been recorded or could occur within five miles of the Study Area, along with a description of their habitat requirements, protection status, and a brief description of each species' likelihood to be present within the Study Area. Several species known to occur within five miles of the Study Area and listed in Table III.N-5 were determined not likely to occur or to be absent from the Study Area because (1) the site lacks suitable habitat or is outside of the species' range and, (2) no instances of such species were observed during any of the field surveys (these species are further discussed in the *Bayview Waterfront Project Biological Technical Report*, which is provided as

[695] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27 2004.

Appendix N1 to this EIR[696]). Consequently, the detailed species' discussions and impact analysis in this EIR section address only those species in Table III.N-5 that have a "Low" or better probability to occur within the Study Area. Those species or habitats with a "Not Likely" or "Absent" likelihood of occurrence in Table III.N-5 are not addressed further because they are not expected to occur on the Study Area or be affected by Project implementation.

Sensitive Plants

The USFWS, CNDDB, and CNPS reported 41 special-status plant species as potentially occurring within the US Geological Survey's 7.5-minute San Francisco South and Hunters Point quadrangles (refer to Table 2 [Special-Status Species Potentially Occurring within the Vicinity of the Bayview Waterfront Project] in Appendix N1 to this EIR).

The Study Area is largely developed and most vegetation in the area was introduced as landscape plants and turf grass. Much of the Study Area, including virtually all of CPSRA, is located on Bay fill. Ruderal (disturbed) habitats and ornamental landscaping predominate in those portions that are not landscaped. Jones & Stokes conducted botanical habitat assessments of the Candlestick Point and HPS on October 29, 2004; March 1, 2006; October 6, 2006; and May 17, 2007.[697] PBS&J botanists conducted rare plant surveys for the Candlestick Point area in May 2008. The general absence of suitable habitat over a majority of the Study Area in conjunction with the absence of observed special-status plants, either as observed during focused surveys or cited in CNDDB species accounts, supports the conclusion that no sensitive plant species occur within the Study Area.

Sensitive Vegetation Communities and Habitats

Waters of the United States and Navigable Waters

The Study Area contains several categories of jurisdictional waters of the United States, including jurisdictional wetlands that are subject to Section 404 of the *Clean Water Act* (Section 404). The types of wetlands include salt marsh and seasonal freshwater wetlands. In addition, the Study Area also contains open waters of the San Francisco Bay, which are subject to both Section 404 of the *Clean Water Act* and Section 10 of the *Rivers and Harbors Act of 1899* (Section 10). Section 404 regulates the placement of fill into any "waters of the United States." Waters of the United States are broadly defined to include navigable waterways, their tributaries, lakes, ponds, and wetlands, including tidal waters and wetlands from the HTL seaward. Section 10 regulates the placement of fill into navigable waters of the United States, including tidal waters from the MHW elevation seaward. Section 10 waters are a subset of Section 404 waters, and are therefore not described separately for purposes of this EIR. A more detailed discussion of the requirements of Section 404 and Section 10 is provided in Section III.N.3 (Regulatory Framework).

A wetland delineation was conducted by H.T. Harvey & Associates for the Study Area that distinguished jurisdictional wetlands and other waters of the United States subject to Section 404.[698] The revised H.T.

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[696] PBS&J, *Candlestick Point/Hunters Point Shipyard Project Biological Technical Report,* prepared for the San Francisco Redevelopment Agency, San Francisco Planning Department, December 11, 2008 updated November 2, 2009.
[697] Jones and Stokes, *Natural Environmental Study Report for the Bayview Transportation Improvements Project*, June 2009.
[698] H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters,* San Francisco, California, February 2009 and revised July 13, 2009 and October 13, 2009.

Harvey & Associates wetland delineation was submitted to the USACE in July 2009 and was verified in August 2009. The study area for that delineation included the Project site and the off-site areas where Project activities would occur (Figure III.N-3 [Wetlands and Other Waters]). As indicated on Figure III.N-3, the study area for H.T. Harvey's original wetland delineation did not included several limited areas that are now considered part of the Project site. As a result, H.T. Harvey expanded its original delineation by inspecting these additional areas in the field on October 8, 2009. H.T. Harvey & Associates has amended its wetland delineation report, and verification of jurisdictional boundaries in these additional areas by the USACE is pending.

According to USACE regulations and guidance, other waters may include lakes, seasonal ponds, channels, tributary waters, non-wetland linear drainages, and seasonal springs. Such areas are identified by the (seasonal or perennial) presence of standing or running water and generally lack hydrophytic vegetation.

In tidal waters, Section 404 other waters extend to the landward extent of vegetation associated with salt or brackish water or the HTL. The HTL is defined as the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The HTL may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gauges, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm. Confirmation of this definition and approach used by the San Francisco District of the USACE in determining the MHW and HTL locations was obtained from the Regulatory Branch of the USACE on January 29, 2009.[699] The HTL represents the upper limit of Section 404 other waters and is approximately 1.5 to 2 vertical feet above the MHW mark.[700]

Table III.N-2 (Wetlands and Other Waters of the United States [Section 404] within the Study Area) presents the acreage of waters of the United States (including jurisdictional wetlands) that were delineated for the Study Area. The acreages of jurisdictional wetlands and waters identified in Table III.N-2 include the HT Harvey study area boundary as identified in Figure III.N-3 (which includes open waters adjacent to Candlestick Point and HPS Phase II), as well as off-site areas of Yosemite Slough that are located outside of this boundary.

[699] Ibid.
[700] Ibid.

SOURCE: HT Harvey, 2009; Moffat & Nichol, 2009; PBS&J, 2009.

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FIGURE III.N-3

Candlestick Point — Hunters Point Shipyard Phase II EIR

WETLANDS AND OTHER WATERS

Table III.N-2 Wetlands and Other Waters of the United States (Section 404) within the Study Area

Jurisdictional Feature (Waters of the United States)	*Area*		*Yosemite Slough*		
	Candlestick Point	*Hunters Point Shipyard*	*On Site*	*Off Site*	*Total Acreage*
Freshwater Wetland	—	0.20	—	—	0.20
Non-tidal Salt Marsh	—	1.81	—	—	1.81
Tidal Salt Marsh	0.93	1.75	0.01	0.05	2.74
"Other 404 Waters"	21.82	169.29	1.66	2.77	195.54
Totals for Section 404 Wetlands and Waters of the US	***22.75***	***173.05***	***1.67***	***2.82***	***200.29***

SOURCE: H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters, San Francisco, California*, February 2009 and revised July 13, 2009 and October 13, 2009.

a. Total equals sum of Freshwater Wetland, Non-tidal Salt Marsh, Tidal Salt Marsh, and Other 404 Waters

b. On-site areas within Yosemite Slough refer to areas within the Study Area. Off-site areas within Yosemite Slough are those areas adjacent to the slough that are outside of the Study Area boundary.

Eelgrass Beds

Eelgrass occurs in both subtidal and intertidal areas of San Francisco Bay. The distribution of eelgrass has been mapped relatively recently (in 2003) and the results of this effort indicate that low-density eelgrass beds are found on the north side of Hunters Point peninsula offshore from the end of Earl Street and in a small patch in the South Basin.[701] Eelgrass beds form areas of important habitat for birds, fish, and crustaceans and are one of the preferred spawning habitats of Pacific herring.[702] These plants also support grazing crustaceans, shrimp, and amphipods. Because it requires light for photosynthesis, eelgrass is limited by water clarity to depths of about 6 feet or less. Because little accurate information exists about the historic distribution of eelgrass beds, and because of their current relative scarcity and importance in the overall ecology of the Bay, both the USACE and CDFG consider eelgrass beds a sensitive resource.

Sensitive Wildlife

Invertebrates

*Monarch Butterfly (*Danaus plexippus*)*

Monarch butterflies are common and widespread in California, including the San Francisco Bay area. However, because they tend to gather in winter roosting sites along the California coast in relatively few locations, roost sites that are used traditionally by large numbers of individuals are considered sensitive biological resources and, thus, this common butterfly is discussed here as a sensitive species. Wintering sites in California are associated with wind-protected groves of large trees (primarily eucalyptus or pine) with nectar and water sources nearby, generally near the coast.

[701] San Francisco Bay Eelgrass Inventory, June-October 2003. Prepared for Caltrans and NOAA Fisheries. Prepared by Merkel and Associates, 2003.

[702] Wyllie-Echeverria, S. and M. Fonseca. Eelgrass (*Zostera marina*) research in San Francisco Bay, California from 1920 to the Present. 2003.

A total of seven monarch butterflies were observed during the Yosemite Slough Watershed Wildlife Survey.[703] Ms. Mia Monroe, a Ranger with the Muir Woods National Monument (US National Parks Service) and co-coordinator of the Monarch Campaign for the past 15 years, was contacted in July 2008 and July 2009 to inquire about any known monarch wintering roosts that occur in the Project site. Ms. Monroe consulted with local monarch butterfly specialists and the Monarch Campaign Thanksgiving counts. The Monarch Campaign conducts surveys for peak monarch butterfly wintering population around the Thanksgiving holiday. Ms. Monroe reported there are no records of monarch butterfly autumnal (i.e., temporary bivouac site) nor over-wintering use of the Project site in the CNDDB or reported in other records, including anecdotal observations. The nearest observations of monarch butterfly roosts are at Fort Mason, the Presidio of San Francisco, and Stern Grove.[704]

Using the likelihood of occurrence definitions provided in Table III.N-5, although individual monarch butterflies were observed, the sensitive winter roosting habitat is "not likely" to occur within the Study Area.

Birds

While the CNDDB reports no occurrences of any special-status bird species in the Study Area, special-status bird species have been recorded in the Study Area during the Yosemite Slough Watershed Wildlife Survey and by Alan Hopkins, as documented in that survey's report. Special-status bird species with potential to occur on the site are described below and are also summarized in Table III.N-5. Although the harlequin duck (*Histrionicus histrionicus*), Barrow's goldeneye (*Bucephala islandica*), common loon (*Gavia immer*), yellow warbler (*Dendroica petechia*) and Vaux's swift (*Chaetua vauxi*) have all been observed within the site, these species are considered California Species of Special Concern only when breeding. [705] As they only occur within the site as non-breeders, none of them are discussed below, as they would be present only when they would not be considered Species of Concern.

*Alameda Song Sparrow (*Melospiza melodia pusillula*)*

The Alameda song sparrow is a CDFG Species of Special Concern. The Alameda song sparrow occurs only in the marshlands of the southern San Francisco Bay Region.[706] The primary range of the Alameda song sparrow extends from Coyote Creek, at the southern extremity of the Bay, northward along the west shore of South San Francisco Bay to Belmont Slough (south of the Study Area) and along the east shore to San Lorenzo. Song sparrows nest in dense riparian thickets, emergent wetlands (including salt marshes), and dense thickets of other vegetation.[707] The Alameda song sparrow uses tidal salt marsh habitats along the edge of the Bay and streams where tidal flow affects the vegetation. Candlestick Point and HPS Phase II provide potential habitat for this species in salt marshes along the shoreline, but due to the very narrow nature of tidal salt marsh in the Study Area, such habitat is marginal at best for this species. Song sparrows were observed

[703] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[704] Monroe, M., Ranger, Muir Woods National Monument, telephone conversation with Todd Wong, PBS&J, July 16, 2008 and July 20, 2009.
[705] California Department of Fish and Game (CDFG). Electronic file: http://www.dfg.ca.gov/wildlife/nongame/ssc/birds.html, accessed on July 30, 2009.
[706] Walton, B., 1974. *Salt Marsh Song Sparrow Study.* California Department of Fish and Game (CDFG), 1974. Available at: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=4696. Accessed July 21, 2008.
[707] Madrone Audubon Society, *Sonoma County Breeding Bird Atlas*, 1995.

between January 2003 and April 2004 along Yosemite Slough, but the observed sparrows may or may not be Alameda song sparrows.[708] Observations in April may be of breeding birds although nesting has not been documented. Given the marginal quality of habitat on the site, the site's isolation from more extensive marshes that may serve as source populations for Alameda song sparrows, and the sedentary nature of Alameda song sparrows, it is possible that these are the more widespread race *gouldii* or that they represent migrants or wintering individuals from other races that occur in the region during the non-breeding season. The CNDDB does not report occurrences of Alameda song sparrow in the Study Area.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "low" likelihood to occur within the Study Area.

*American Peregrine Falcon (*Falco peregrinus anatum*)*

The American peregrine falcon is a state-listed endangered species and a CDFG fully protected species pursuant to Section 3511 of the *California Fish and Game Code*; however, the California Fish and Game Commission voted to remove the species from the state endangered species list on August 6, 2009. The bird has experienced a remarkable resurgence in California and other parts of North America. This striking recovery is due in large measure to the ban on the use of DDT (a synthetic pesticide) in many places , including the United States. The peregrine has recovered in North America to the point that the USFWS removed the species from the federal Endangered Species List on August 25, 1999.[709] A pair of American peregrine falcons has nested in the Re-gunning crane on Parcel D of the Shipyard, and has raised several broods at this location over the years.[710] These birds forage widely over the entire Study Area, likely feeding primarily on rock pigeons (*Columba livia*) and waterbirds.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area.

*Bryant's Savannah Sparrow (*Passerculus sandwichensis alaudinus*)*

Bryant's savannah sparrow is a CDFG Species of Special Concern. Bryant's savannah sparrow is a California endemic restricted to a narrow coastal strip from Humboldt Bay south to the Morro Bay; its center of abundance appears to be the San Francisco Bay area.[711] This sparrow occupies low tidally influenced habitats, adjacent ruderal areas, moist grassland within and just above the fog belt, and infrequently, drier grasslands. Adjacent to salt marshes this sparrow also occupies weedy spoil areas, canal banks, and bottomland pastures. In South San Francisco Bay, it nests mainly on levee tops grown to grasses and in areas of high pickleweed on levee banks. Bare ground, whether provided by tidal mud flats or upland interstitial areas between clumps of vegetation, appears to be an important component of occupied habitat. The Study Area provides potential habitat for this species in salt marshes along the shoreline, but because

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[708] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[709] United States Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Final Rule To Remove the American Peregrine Falcon From the Federal List of Endangered and Threatened Wildlife, and To Remove the Similarity of Appearance Provision for Free-Flying Peregrines in the Conterminous United States*; Final Rule, 64 Federal Register 46542, August 1999.
[710] Nelson, G., Facility Coordinator, Department of the Navy, field visit with PBS&J, July 8, 2008.
[711] California Department of Fish and Game (CDFG). *California Birds Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California*. Studies of Western Birds 1. 2008.

of the very narrow nature of tidal salt marsh in the Study Area only marginal quality habitat is available. Savannah sparrows were observed between January 2003 and April 2004 along Yosemite Slough, although the observed sparrows may or may not be Bryant's savannah sparrows.[712] Observations in April 2004 may be of breeding birds although nesting has not been documented. Given the marginal quality of habitat on the site and the site's isolation from more extensive marshes that may serve as source populations for savannah sparrows, it is possible that these represent migrants or wintering individuals from other races that occur in the region during the non-breeding season. The CNDDB does not report occurrences of the Bryant's savannah sparrow bird in the Study Area.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "low" likelihood to occur within the Study Area.

*Burrowing Owl (*Athene cunicularia*)*

Burrowing owl, a CDFG Species of Special Concern, is an owl that dwells in generally flat, open, dry grasslands, pastures, deserts, and shrub lands, and in grass, forbs and open-shrub stages of pinyon-juniper and ponderosa pine habitats. Burrowing owls use communal ground squirrel and other small mammal burrows for nesting and cover, as well as artificial structures such as roadside embankments, levees, and berms. They can exhibit high site fidelity, often reusing burrows year after year. Occupancy of suitable burrowing owl habitat by breeding birds can be verified at a site by observation of a pair of burrowing owls during their breeding season (March to August) or, alternatively, by the presence of molted feathers, cast pellets, prey remains (rodents, small reptiles, and large insects), eggshell fragments, or whitewash (guano), at or near a burrow. Burrowing owls are fairly tolerant of human activity near their nest burrows as long as suitable foraging habitat exists nearby. Owl populations have declined sharply in some portions of California during the past two decades (i.e., the San Francisco Bay Area, Sacramento County, San Joaquin County, etc.), but they have increased greatly in some agricultural counties (particularly Imperial). Field work for the *San Francisco Breeding Bird Atlas* in 1991-1993 did not detect breeding evidence by this species anywhere in the City.[713] The CNDDB does not report occurrences of this species in the area, but burrowing owls have been recorded previously on the site. Historically, they occurred in a rubble pile in the northeastern corner of Candlestick Point, and there have been sporadic sightings of the species in various locations on HPS as well. Breeding is not known to have occurred in the Study Area, and these individuals may all have been migrants and wintering individuals.[714] The frequency of occurrence has apparently declined in recent years, and although suitable breeding, roosting, and foraging habitat is present within the Study Area, the species does not currently breed here and occurs sporadically and in low numbers, at best.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area.

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[712] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[713] San Francisco Field Ornithologists. 2003. *San Francisco Breeding Bird Atlas*.
[714] Personal Communication between from Alan Hopkins to Steve Rottenborn, July 10, 2009.

*California Brown Pelican (*Pelecanus occidentalis californicus*)*

The California brown pelican is on the verge of recovery. It has been proposed for delisting by the Fish and Game Commission[715] and also recently proposed for delisting under the FESA.[716] It is fully protected by CDFG under Section 3511 of the *California Fish and Game Code*. The California brown pelican is found in estuarine, marine sub-tidal, and marine pelagic (deep) waters along the California coast. Pelicans nest from the Channel Islands of Southern California southward along the Baja California coast and in the Gulf of California to coastal southern Mexico.[717] The pelican builds nests of sticks on the ground, typically on islands or offshore rocks. Post-breeding adults and immature birds are found along the Pacific Coast from Oregon south into Baja, Mexico. This species has been observed perching on piers within HPS Phase II, particularly the three piers in the southeastern corner of HPS Phase II, and it forages within San Francisco Bay; however, the species has never nested as far north as the Bay and nesting habitat for this species is not present in the Study Area. In addition, CNDDB does not report occurrences of California brown pelican communal roosts in the Study Area.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area.

*Loggerhead Shrike (*Lanius ludovicianus*)*

The loggerhead shrike, a CDFG Species of Special Concern, is a common resident and winter visitor in lowlands and foothills throughout California and prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. It occurs only rarely in heavily urbanized areas, but is often found in open cropland. The *San Francisco Breeding Bird Atlas*, for which field work was conducted in 1991-1993, reported a record of possible breeding in the atlas block that included HPS and referred to a historical breeding record in the atlas block that includes Candlestick Point.[718] Low numbers of loggerhead shrikes have been observed on Candlestick Point and HPS by Alan Hopkins, and non-native grasslands provide suitable foraging habitat and on-site trees provide suitable nesting habitat for this species. However, there is no evidence of confirmed breeding in recent years, and the species currently occurs as an uncommon migrant and winter resident.[719]

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area. However, this species is considered a California Species of Special Concern only when breeding. Because it is currently known to occur in the Study Area only as a non-breeder, it would not be considered a Species of Special Concern in the Study Area.

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[715] California Department of Fish and Game (CDFG) news release: *Fish and Game Commission votes to remove California brown pelican from State Endangered Species List*. February 17, 2009.
[716] United States Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Species Account: California Brown Pelican* (*Pelecanus occidentalis californicus*); Classification: Proposed for delisting; Federal Register 73:9407; February 20, 2008.
[717] California Department of Fish and Game (CDFG) B043, *Brown Pelican*. Website*:* http://www.dfg.ca.gov/whdab/html/B043.html. Accessed April 19, 2005.
[718] San Francisco Field Ornithologists. 2003. *San Francisco Breeding Bird Atlas*.
[719] Personal Communication between from Alan Hopkins to Steve Rottenborn, July 10, 2009.

*Northern Harrier (*Circus cyaneus*)*

The northern harrier, a CDFG Species of Special Concern, prefers coastal prairies, marshes, grasslands, swamps and other open areas. Although this species primarily eats small rodents (mice and voles), amphibians, small reptiles, small rabbits, and other birds, northern harriers will eat some invertebrates as well. Northern harriers usually return to the same area to nest in consecutive years. They nest on the ground in well-concealed locations, often near low shrubs or in tall clumps of vegetation. Nesting locations are usually in abandoned fields, wet meadows, and coastal and inland marshes. Wetlands and non-native grasslands provide suitable foraging habitat for small numbers of this species on the site, and northern harriers have been observed by Alan Hopkins in the Study Area.[720] However, due to the extent of disturbance by humans and pets, the lack of extensive wetlands suitable for nesting, and the vulnerability of ground-nesting birds to predation in upland portions of the Study Area, harriers are not expected to nest there. Field work for the *San Francisco Breeding Bird Atlas* in 1991-1993 did not detect breeding evidence by this species anywhere in the City.[721]

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area. However, this species is considered a California Species of Special Concern only when breeding. Because it is currently known to occur in the Study Area only as a non-breeder, it would not be considered a Species of Special Concern in the Study Area.

*San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*)*

The San Francisco common yellowthroat is a California Species of Concern and is one of four subspecies of common yellowthroat that breed in California. The breeding range of the San Francisco common yellowthroat as described by Foster is bounded by Tomales Bay on the north, Carquinez Strait on the east, and Santa Cruz County on the south, which would include the Study Area.[722] Yellowthroats are found in freshwater marshes, coastal swales, swampy riparian thickets, brackish marshes, salt marshes, and the edges of disturbed weed fields and grasslands that border soggy habitats.[723] In the San Francisco Bay region as a whole, about 60 percent of yellowthroats breed in brackish marsh, 20 percent in riparian woodland/swamp, 10 percent in freshwater marsh, 5 percent in salt marsh, and 5 percent in upland vegetation.[724] The brackish marsh in the Study Area provides potential habitat for this species, although the limited extent of such habitat limits the possibility that the species currently breeds here. Common yellowthroats were observed between January 2003 and April 2004 during surveys along Yosemite Slough, though it is unknown whether these were San Francisco common yellowthroats or migrants/wintering birds of other races.[725] Field work

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[720] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[721] San Francisco Field Ornithologists. 2003. *San Francisco Breeding Bird Atlas.*
[722] Foster, M. L., *Status of the salt marsh common yellowthroat (Geothylpis trichas sinuosa) in the San Francisco Bay Area, California 1975–1976*, California Department of Fish and Game (CDFG), 1977.
[723] Shuford, W.D., The Marin County breeding bird atlas. Bushtit Books. Bolinas, California. pp. 479, 1993.
[724] Hobson, K., P. Perrine, E.B. Roberts, M.L. Foster and P. Woodin, *A breeding season survey of salt marsh common yellowthroats (Geothylpis trichas sinuosa) in the San Francisco Bay Region.* Report of the San Francisco Bay Bird Observatory to the US Fish and Wildlife Service, 1986.
[725] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.

for the *San Francisco Breeding Bird Atlas* in 1991-1993 did not detect breeding evidence by this species anywhere in the eastern part of the City, including the Project vicinity.[726]

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "moderate" likelihood to occur within the Study Area.

*Short-eared owl (*Asio flammeus*)*

The short-eared owl, a California Species of Concern, is usually found in open areas with few trees such as annual and perennial grasslands, prairies, meadows, dunes, irrigated lands, and saline and fresh emergent marshes. Its prey consists of small mammals, marsh birds, insects, reptiles, and amphibians.[727] The short-eared owl will usually nest on dry ground in a depression that is concealed in vegetation; occasionally the nest will be placed in a burrow. It requires dense vegetation for roosting and resting cover. This includes tall grasses, brush, ditches, and wetlands. Open, treeless areas containing elevated sites for perching are also needed. This species was observed by Alan Hopkins on the site[728] and the Study Area provides suitable foraging habitat for this species. As a result, short-eared owls are expected to forage occasionally in low numbers on the site. However, due to the extent of disturbance by humans and pets, the lack of extensive wetlands suitable for nesting, and the vulnerability of ground-nesting birds to predation in upland portions of the Study Area, short-eared owls are not expected to nest there. Field work for the *San Francisco Breeding Bird Atlas* in 1991-1993 did not detect breeding evidence by this species anywhere in the City.[729]

- Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area. However, this species is considered a California Species of Special Concern only when breeding. Because it is currently known to occur in the Study Area only as a non-breeder, it would not be considered a Species of Special Concern in the Study Area.

*Tricolored Blackbird (*Agelaius tricolor*)*

The tricolored blackbird, a California Species of Concern, is a highly social, marsh-nesting bird that lives in flocks numbering from less than one hundred to many thousands. Tricolored blackbirds are permanent residents of California, but birds make extensive migrations and movements, both in the breeding season and in winter, within their restricted range.[730] Tricolored blackbirds live in large colonies, and they prefer open accessible water, a protected nesting substrate such as flooded, thorny or spiny vegetation, and a suitable foraging space providing insect prey within a few miles of nesting colonies. Nesting habitat includes cattails and bulrushes or ungrazed grasslands containing tall grasses. Other plant species that are used for nesting include young willow thickets and wild rose. This species has been observed by Alan Hopkins on the Study Area[731] and the site provides suitable foraging habitat for the species. However, no

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[726] San Francisco Field Ornithologists. 2003. *San Francisco Breeding Bird Atlas.*
[727] http://www.delta.dfg.ca.gov/gallery/shearowl.asp.
[728] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.
[729] San Francisco Field Ornithologists. 2003. *San Francisco Breeding Bird Atlas.*
[730] Shuford, W. D., and Gardali, T., editors. 2008. *California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California*. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
[731] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27, 2004.

suitable breeding habitat is present, no colonies are known to occur in the area, and the *San Francisco Breeding Bird Atlas* did not confirm breeding by this species anywhere in the City.[732]

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area. However, this species is considered a California Species of Special Concern only when breeding. Because it is currently known to occur in the Study Area only as a non-breeder, it would not be considered a Species of Special Concern in the Study Area.

*White-tailed Kite (*Elanus leucurus*)*

The white-tailed kite is listed as a fully protected species under Section 3511 of the *California Fish and Game Code*. White-tailed kites feed on rodents, small reptiles, and large insects in fresh emergent wetlands, annual grasslands, pastures, and ruderal vegetation. They breed between February and October. Kites often roost, and occasionally nest, communally especially during the non-breeding season. Therefore, disturbance of a relatively small roost or nesting area could affect a large number of birds. The white-tailed kite can commonly be observed foraging in extensive open grasslands throughout most of the San Francisco Bay region. While white-tailed kites were not observed during surveys conducted by PBS&J biologists on the Project site, small numbers of individuals were observed during the Yosemite Slough Wildlife surveys.[733] The species is not known to nest on the site,[734] but the grasslands and ruderal habitats on the Project site provide suitable foraging habitat for small numbers of non-breeding individuals that occasionally occur there.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species is "known" to occur within the Study Area.

Terrestrial Mammals

*Western Red Bat (*Lasiurus blossevillii*)*

- The only special-status bat species potentially occurring within the Study Area is the western red bat (*Lasiurus blossevillii*). The western red bat is not known to breed in San Francisco, but the species is migratory, and red bats occur here during migration and possibly during winter. Western red bats are not colonial, and, thus, the species is expected to occur in the Study Area only in small numbers. They are known to roost in the foliage of a number of tree species, including eucalyptus. Potential habitat for this species is present within the eucalyptus and other mature trees within the Project site. However, most bat species are sensitive to human-generated disturbance. Identification of bats requires special surveys that were not conducted for this analysis. Therefore, the conservative assumption is that this species of sensitive bat is present within the Study Area.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "moderate" likelihood to occur within the Study Area.

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[732] San Francisco Field Ornithologists. 2003. *San Francisco Breeding Bird Atlas*.
[733] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27 2004.
[734] Personal Communication between from Alan Hopkins to Steve Rottenborn, July 20, 2009.

Sensitive Aquatic Resources

Mollusks

*Olympia Oyster (*Ostreola conchaphila*)*

Native Olympia oysters were historically abundant in San Francisco Bay. Oyster beds are a cornerstone in the benthic habitat, improving water quality, and providing habitat complexity that favors fish and vegetation. They also provide an important link between pelagic and benthic food webs. Their function in the estuarine food web—oyster beds generally increase fish abundance and thus make up an essential part of the Essential Fish Habitat (EFH)[735]—they are considered an important resource within this EIR as only a few relict populations remain in the Bay.[736]

- Recently, small populations of native oysters have been documented within the Bay.[737,738] Detailed surveys for native oysters were not conducted as part of this Project. Suitable habitat is distributed throughout the shoreline of Study Area. Suitable substrate is solid surfaces to which the larvae can easily attach.[739] Because the larval forms of oysters are free-floating in the Bay, and a large population exists south of the Study Area at Oyster Point Marina,[740] native oysters are likely present on suitable substrate throughout the Study Area.

Fish

*Green Sturgeon (*Acipenser medirostris*)*

The southern distinct population segment of green sturgeon (including those that reside in the Sacramento River) was listed as threatened under the FESA by NMFS on April 7, 2006.[741] Green sturgeon is a long-lived, anadromous, native fish that occurs in low numbers in the San Francisco Estuary and Sacramento River. Adults spawn in freshwater rivers from British Columbia south to the Sacramento River. In the Sacramento River, spawning occurs near Red Bluff and possibly in the Feather River. Larvae develop within these freshwater systems, migrate downstream, and remain in the estuaries for between 1 and 4 years before migrating to the ocean. Mature adults move into estuaries in the spring and spawning adults move up the rivers of their origins in late spring/early summer. Post spawning adults return to the estuary before migrating back to the ocean in late fall. Sub-adult fish also are thought to enter estuaries during

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735 National Marine Fisheries Service (NMFS). 2006. Fisheries Management Plan (FMP) Species Distributions In San Francisco, San Pablo and Suisun Bays. Website: http://swr.nmfs.noaa.gov/hcd/loclist.htm#South%20SF%20Bay. Accessed October 29, 2008.
735 National Marine Fisheries Service (NMFS). Essential Fish Habitat (EFH) for Pacific Coast Groundfish. Map dated July 26, 2008.
736 National Marine Fisheries Service (NMFS), No Date. *Native Oyster Habitat Restoration, Program Briefing Document*. Fisheries Southwest Region.
737 Harris, H.E., 2004. *Distribution and limiting factors of Ostrea conchaphila in San Francisco Bay, MS Thesis,* San Francisco State University.
738 Latta, M., 2006. Personal communication with Marilyn Latta, Habitat Restoration Director, Save the Bay, with D. Ebert and others at a meeting on October 18, 2006.
739 Harris, H.E., 2004. *Distribution and limiting factors of Ostrea conchaphila in San Francisco Bay, MS Thesis*, San Francisco State University.
740 MACTEC Engineering and Consulting, Inc. 2008. *Oyster Point Marina Olympia Oyster Surveys Pre- and Post-Dredging February 2008, Oyster Point Marina, South San Francisco, California*. Prepared for PBS&J.
741 National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon*, 71 Federal Register 17757, 2006.

summer and fall months. The Study Area is along the San Francisco Bay, which is a saltwater habitat; the Study Area does not support the necessary freshwater spawning habitat for adult fish.[742] Juvenile fish and sub-adults may rear in the adjacent waters of San Francisco Bay.

The NMFS designated critical habitat for green sturgeon on October 2009.[743] Specific areas designated as critical habitat include: coastal US marine waters within 60 fathoms depth (360 feet) from Monterey Bay, California, north to Cape Flattery, Washington, including the Strait of Juan de Fuca, Washington, to its United States boundary; the Sacramento River, lower Feather River, and lower Yuba River in California; the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco bays in California; and certain coastal bays and estuaries in California, Oregon, and Washington. The areas designated comprise approximately 320 miles of freshwater river habitat, 897 square miles of estuarine habitat (including the San Francisco Bay), 11,421 square miles of marine habitat, and 135 square miles of habitat within the Yolo and Sutter bypasses. [744] Under the FESA, critical habitat includes those areas necessary to support the continued existence and recovery of this species. Critical habitat for green sturgeon includes all of San Francisco Bay. Critical habitat designations include the specific habitat and habitat functions that are necessary for the survival and recovery of the species; these are called primary constituent elements (PCEs). Within the estuarine category of critical habitat, the PCEs include food, flow, water quality, migratory pathways, depth, and sediment quality.[745] Food is an abundance of prey items, benthic invertebrates and shrimp, within the substrate upon which sturgeon can forage. Flow refers to ample movement of water within the estuary to allow adults to orient to the Sacramento River during their spawning migrations. Water quality refers to adequate levels of dissolved oxygen, salinity, and temperatures to allow for survival and growth. Water quality also includes low levels of contaminants that could affect survival or reproductive fitness. A migratory pathway refers to the fact that sturgeon migrate through the Bay to and from upstream spawning areas. The PCE for migratory pathways allows for safe and timely passage of fish between the ocean and upstream spawning areas, but it also includes localized movement of rearing and holding sturgeon within the Bay. The depth PCE refers to the variety of water depths required to provide suitable foraging, holding, and migratory areas. Sediment quality is important because sturgeons are benthic foragers (bottom feeders) and contaminant-free sediments support higher quality prey that do not affect the survival or reproductive fitness of the fish. The Study Area includes elements of all these PCEs. However, the sediment quality may be impaired by decades of industrial use, which has resulted in contamination (refer to Section III.K [Hazards and Hazardous Materials] of this EIR). This in turn probably reduces the foraging quality.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "high" likelihood to occur within the Study Area.

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[742] Moyle, Peter B. *Inland Fishes of California*, 2002, University of California Press.
[743]National Marine Fisheries Service (NMFS), *Endangered and Threatened Wildlife and Plants: Final Rulemaking to Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon*. 74 Federal Register 52300, October 9, 2009.
[744] Ibid.
[745] Ibid.

*Chinook Salmon (*Oncorhynchus tshawytscha*)*

Populations of Chinook salmon potentially found adjacent to the Project site fall into three Evolutionary Significant Units (ESUs): Winter-run, Spring-run, and Fall/late-Fall-run[746] Chinook salmon. The runs of Chinook are distinguished based on the timing of the adult return to freshwater on their spawning migration. At almost any time of year, there are Chinook at some life cycle stage or another within San Francisco Bay (Table III.N-3 [Life Cycle Stages and Periods of Freshwater Residency for Chinook Salmon]). The occurrence of Chinook adjacent to the Project site could involve any of those life stages. Juvenile fish are more likely to be found adjacent to the Project site than adults because they are moving downstream from their natal streams and do not have the same swimming ability as adults. Juvenile fish from the Sacramento River populations would be expected to occur in low numbers as they stray south of the Golden Gate. Small numbers of Chinook have also recently appeared in Coyote Creek and Guadalupe River, which are both tributaries to south San Francisco Bay near Alviso; these fish are derived from hatchery releases within the native range of the species, which did not include the South Bay.[747,748] Adult or juvenile fish from either of these populations would be expected to migrate through or past the Study Area on their way to and from the Pacific Ocean because the Study Area is between the Pacific Ocean and spawning sites in the South Bay. The overall likelihood of finding a substantial number of Chinook salmon within or adjacent to the Project site at any one time is relatively low because the open water of the Study Area is not considered suitable rearing habitat for either life stage. The residence time that either life stage may spend within or adjacent to the Project site is unknown.

Table III.N-3 Life Cycle Stages and Periods of Freshwater Residency for Chinook Salmon

Species	*Adult Migration (peak)*	*Spawning (peak)*	*Juvenile Freshwater Residency*	*Outmigration (peak)*
Winter Run	Dec–July (Mar)	Apr–Aug (May–June)	5–10 months	July Oct
Spring Run	Mar–Sep (May–June)	Aug–Oct (Sep)	3–15 months	Nov–Mar (Jan–Mar)
Fall Run	June–Dec (Sep–Oct)	Sep–Dec (Oct–Nov)	1–7 months	Dec–Mar
Late Fall Run	Oct–Feb (Dec)	Jan–Apr (Feb–Mar)	7–13 months	Apr–June (Dec–Mar)

SOURCE: Moyle, 2002.

Winter-run Chinook are listed as endangered under the California and federal *Endangered Species Act*s. They spawn in the Sacramento River upstream of Red Bluff Diversion Dam and are distinguishable from other Chinook runs based on the timing of both upstream migration and the spawning season (Table III.N-3). Prior to the construction of Shasta and Keswick dams in 1943 and 1955, respectively, winter-run Chinook spawned in the upper reaches of the Sacramento, McCloud, and lower Pit rivers,[749] and Battle Creek. Presently, the majority of winter-run Chinook spawning occurs on the main stem of the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam.[750] Designated critical habitat extends from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of

746 Fall and late-fall run Chinook are treated as a single ESU by NMFS.
747 Santa Clara County, *Santa Clara County Habitat Plan, 1st Administrative Draft* August 2008. Website*:* http://www.scv-habitatplan.org/www/site/alias__default/292/1st_administrative_draft_hcp.aspx. Accessed July 2009.
748 National Marine Fisheries Service (NMFS). No Date. *Central Valley Chinook Salmon Distributions*. Southwest Regional Office. Website: http://swr.nmfs.noaa.gov/hcd/dist2.htm. Accessed July 17, 2009.
749 Moyle, P. B. 2002. *Inland Fishes of California*, University of California Press. 2002.
750 Ibid.

the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Critical habitat does not extend into the Study Area.

Spring-run Chinook salmon are listed as a threatened species under the California and federal ESAs. Spring-run Chinook enter the Sacramento River between March and September and move upstream into the headwaters, where they hold in pools until they spawn between August and October. Juveniles emigrate from the tributaries from mid-November through June; however, some juveniles spend a year in the streams and emigrate as yearlings the following October.[751] Typically, spring-run Chinook salmon use mid- to high-elevation streams that provide appropriate low water temperatures and sufficient flow, cover, and pool depth to allow over summering. Spawning occurs between August and October and, depending on water temperature, emergence occurs between November and March. Although Spring-run Chinook salmon emigration is highly variable, the emigration period extends from November to early May, with up to 69 percent of young-of-the-year out migrants passing through the lower Sacramento River between mid-November and early January.[752] Designated critical habitat extends from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Critical habitat does not extend into the Study Area.

Central Valley Fall and Late Fall-run Chinook salmon are not listed under the state or federal endangered species act but are classified as a Species of Special Concern. Fall-run Chinook salmon is the most abundant ESU, documented to comprise about 92 percent of the Sacramento Basin stock over the past 10 years of available data.[753] The ESU includes all naturally spawned populations of fall-run Chinook salmon in the Sacramento and San Joaquin River basins and their tributaries, east of Carquinez Strait, California. Juvenile fall and late fall-run fish could stray into open waters within and adjacent to the Project site if they miss the entrance to the Golden Gate and the Pacific Ocean.

A small population of Chinook salmon has become established in recent years in Coyote Creek and the Guadalupe River.[754] The regulatory status of this population is unclear because the fall/late fall-run ESU only includes naturally spawned fish from upstream of Carquinez Strait. There is not an ESU that includes fish spawning within the tributaries of San Francisco Bay. These fish exhibit a fall-run pattern similar to the fall-run ESU of the Central Valley, and are apparently derived from wandering individuals, likely

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751 Ibid.

752 Snider, B., and R.G. Titus. 2000. *Timing, composition, and abundance of juvenile anadromous salmonid emigration in the Sacramento River near Knights Landing*, October 1996.

753 California Department of Fish and Game, Fisheries Branch, *Anadromous Resources Assessment, Chinook Salmon Escapement—All Runs*, February 18, 2009.

754 Santa Clara County, *Santa Clara County Habitat Concept Plan, 1st Administrative Draft* August 2008. Website: http://www.scv-habitatplan.org/www/site/alias__default/292/1st_administrative_draft_hcp.aspx. Accessed July 2009.

hatchery-released fish, from that ESU.[755] Regardless of where they came from or what their regulatory status may be, these fish would pass the Study Area on their way to and from the ocean.

Using the likelihood of occurrence definitions provided in Table III.N-5, the spring-run, winter-run/ and fall/late fall-run of this species has a "High" likelihood to occur within the Study Area.

*Central Valley Steelhead (*Oncorhynchus mykiss*)*

Central Valley steelhead (rainbow trout) were federally listed as a threatened species in 1998[756] and this status was reaffirmed in 2006.[757] The Central Valley steelhead population is a Distinct Population Segment (DPS; aka ESU) that includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin rivers and their tributaries. Final critical habitat, designated in September 2005 for this species, does not include the Study Area.[758] Critical habitat is designated by hydrologic unit, the closest of which to the Study Area is the Sacramento Delta Hydrologic Unit, over 25 miles north of the Project site.[759] Central Valley steelhead, especially juveniles, may occasionally stray into the South Bay during their migration to the ocean, but the area adjacent to the Project site is generally outside their migratory pathway.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "low" likelihood to occur within the Study Area.

*Central California Coast Steelhead (*Oncorhynchus mykiss*)*

The Central California Coast DPS of steelhead is a federally threatened species.[760] This DPS includes all naturally spawned populations of steelhead from the Russian River south to, and including, Aptos Creek and includes the populations within San Francisco Bay.[761] Steelhead begin their migration from the ocean when winter rains provide large amounts of cold water for migration and spawning. Peak migration period for adult fish is in mid-winter. They typically spawn in smaller streams and tributaries to mainstream rivers. Juvenile steelhead generally spends one to three years in freshwater before migrating to the ocean.[762]

It is highly likely that both adults and juvenile steelhead from this DPS could be found adjacent to the Project site. The closest potential steelhead spawning streams in South San Francisco Bay are San Mateo Creek (approximately 10 miles south of the Study Area), Alameda Creek (approximately 16 miles south of the Study Area), and San Francisquito Creek (approximately 22 miles south of the Study Area). Other South Bay watersheds that support populations of steelhead include the Coyote Creek and Guadalupe River watersheds. Because the Study Area is between their spawning and rearing streams and the Pacific Ocean, fish from any

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[755] National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Threatened Status for Two ESUs of Steelhead in Washington, Oregon, and California*, 63 Federal Register 13347, 1998.
[756] Ibid.
[757] National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead*; Final Rule, 71 Federal Register 834, 2006.
[758] National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionarily Significant Unites of Pacific Salmon and Steelhead in California*; Final Rule, 70 Federal Register 52488, 2005.
[759] Ibid.
[760] National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Threatened Status for Two ESUs of Steelhead in Washington, Oregon, and California*, 63 Federal Register 13347, 1998.
[761] National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead*; Final Rule. 71 FR 834.
[762] Moyle, P. B. *Inland Fishes of California*, 2002, University of California Press, 2002.

of these streams could be found in the Bay adjacent to the Project site during adult migrations from the Pacific Ocean to spawning sites or during juvenile migrations from their natal streams to the Pacific Ocean.

The final critical habitat designation for the Central California Coast steelhead DPS was issued on September 2, 2005.[763] The specific primary constituent elements considered in the designation were freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, estuarine areas, nearshore marine areas, and offshore marine areas. The lateral extent of critical habitat in estuarine areas is the area inundated by extreme high tide. The Study Area is within the designated critical habitat for this species.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "high" likelihood to occur within the Study Area.

*Longfin Smelt (*Spirinchus thaleichthys*)*

Longfin smelt were listed under the California Endangered Species account as a threatened species in March 2009. This species is endemic to the west coast of North America with small populations likely still present in the Klamath River and Russian River estuaries.[764] However, the bulk of the longfin smelt population appears to be in San Francisco Bay.[765] Adults spawn in the Sacramento-San Joaquin Estuary almost as far upstream as the City of Sacramento on the Sacramento River and to Turner Cut on the San Joaquin River.[766] Adults spawn in these upstream freshwater locations in early winter. The larval smelt are distributed downstream by natural river flow. Because of this, the higher the outflow of freshwater from the Sacramento-San Joaquin Delta, the greater the distribution of smelt in the Bay. As they mature, swimming ability improves and their distribution expands. Adults occur into the South Bay and are also found in the ocean just outside the Golden Gate.[767] This species could be found in the Study Area from spring to fall before adults return upstream to spawn.

Using the likelihood of occurrence definitions provided in Table III.N-5, this species has a "moderate" likelihood to occur within the Study Area.

*Pacific Herring (*Clupea pallasi*)*

San Francisco Bay supports a small, yet productive commercial Pacific herring fishery. Pacific herring are not protected by either the state or the federal government; however, because herring are harvested for their roe, they are an important species in the economy of the San Francisco Bay Area and their populations are closely monitored by CDFG. Pacific herring are also an important species in the ecology of San Francisco Bay because herring, along with sardines and anchovies, are a primary food source for salmon and other sport fish. Pacific herring generally enter the Bay from November through April[768] of each year

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[763] National Marine Fisheries Service (NMFS), *Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionarily Significant Unites of Pacific Salmon and Steelhead in California*; Final Rule, 70 Federal Register 52488, 2005.
[764] Moyle, P. B. *Inland Fishes of California*, 2002, University of California Press, 2002.
[765] California Department of Fish and Game (CDFG), A Status Review of the Longfin Smelt (*Spirinchus thaleichthys*) in California, January 2009.
[766] Ibid.
[767] Ibid.
[768] National Oceanic and Atmospheric Administration (NOAA). 2008. San Francisco Bay Project Impact Evaluation System—Pile Driving. Coastal Restoration and Protection Division. Interactive GIS mapping software Website*:* http://mapping2.orr.noaa.gov/website/portal/pies/ naturalhistory.html. Accessed December 2, 2008.

and spawn in intertidal and sub-tidal habitats.[769] The actual sites where Pacific herring spawn in San Francisco Bay change from year to year and spawning may occur within numerous locations around the Bay. The North Bay is typically the preferred spawning area, although limited spawning has historically been observed at San Mateo Point.[770] The preferred substrate for herring spawning is eelgrass, followed by rocky seafloors, and lastly flat surfaces such as marina pilings, retaining walls, and bulkheads along the San Francisco Bay waterfront.[771] According to NMFS, known herring spawning areas within the area immediately adjacent to the Project site include several piers and areas of shoreline both north and south of the proposed marina (refer to Figure III.N-4 [Pacific Herring Spawning Habitat]).[772] Where Figure III.N-4 shows habitat as including piers, this refers to in-water portions of those structures. Also, the mapping data left gaps between the shoreline and the delineated habitat that is an artifact of the mapping. Spawning grounds could extend to the shoreline, especially in those areas where bulkheads define a vertical shoreline. The open channel to the northwest of the proposed marina between Blandy and E streets may be used by herring even though NMFS does not map it as spawning habitat.

Essential Fish Habitat

The tidal aquatic habitats adjacent to the Project site are considered EFH by the NMFS for a species assemblage that includes anchovies, sardines, rockfish, sharks, sole, and flounder.[773,774] Areas supporting the native Olympia oyster found in San Francisco Bay are also considered EFH by NMFS because oyster beds generally increase fish abundance. A more detailed discussion of the provisions of the *Magnuson-Stevens Fisheries Conservation Act*, by which effects on EFH are regulated, is provided below in Section III.N.3 (Regulatory Framework).

Wildlife Movement

Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (i.e., juvenile animals from natal areas, or individuals extending range distributions); (2) seasonal migration; and (3) local movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover). A number of terms have been used in various wildlife movement studies, such as "wildlife corridor," "travel route," "habitat linkage," and "wildlife crossing," to refer to areas in which wildlife move from one area to another. To clarify the meaning of these terms and facilitate the discussion of wildlife movement in this analysis, these terms are defined as follows:

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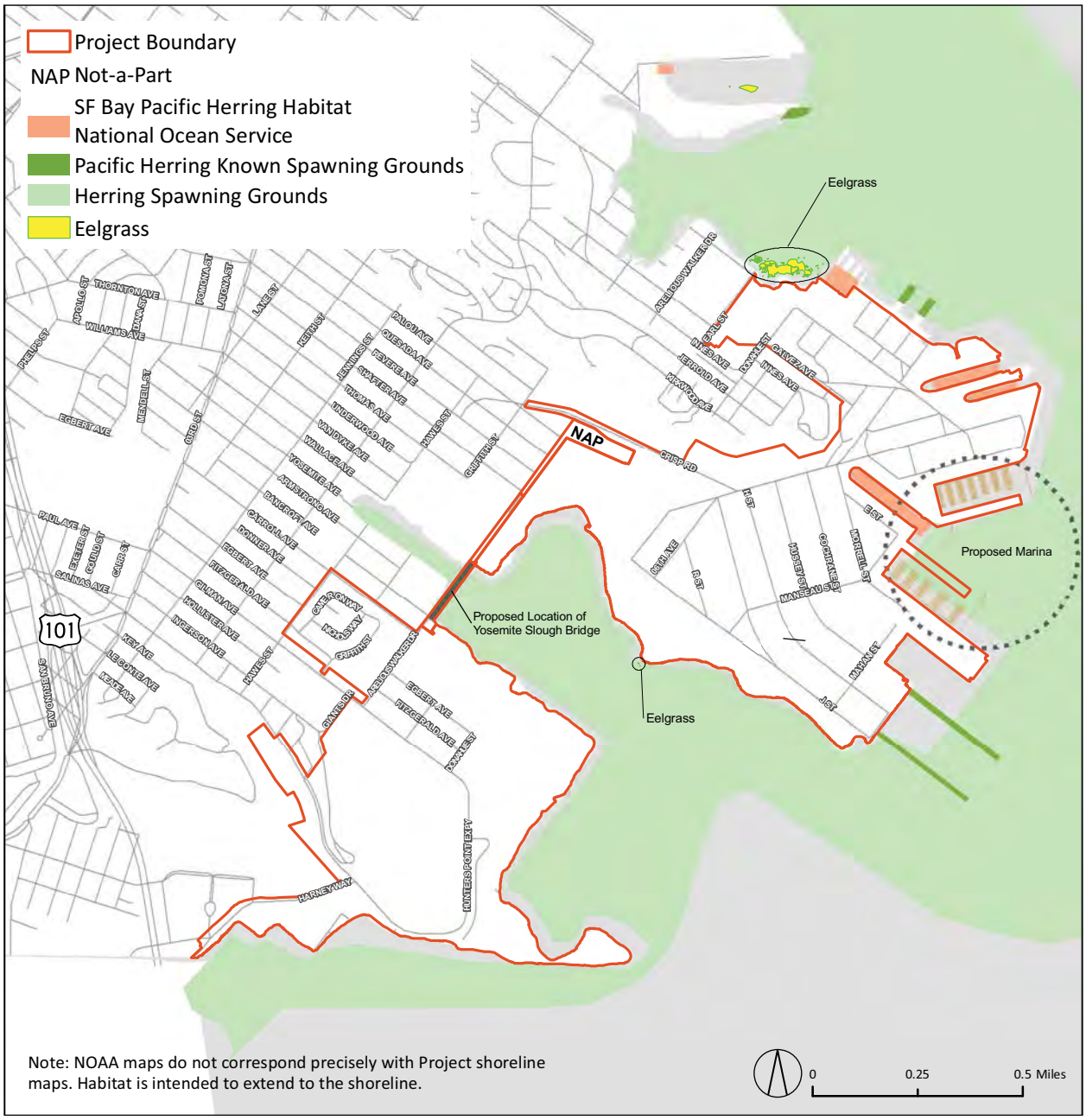
769 Barnhart, R.A. 1988. *Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest)—Pacific herring. US Fish and Wildlife Service Biol. Rep.* 82(11.79). US Army Corps of Engineers, TR EL-82-4. 14 pp.
770 Miller, D. J. and J. Schmidtke. 1956. *Report on the distribution and abundance of Pacific herring (Clupea pallasi) along the coast of Central and Southern California.* California Fish and Game (CDFG) 42(3):163-187.
771 Barnhart, R.A. 1988. *Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest)—Pacific herring. US Fish and Wildlife Service Biol. Rep. 82(11.79).* US Army Corps of Engineers, TR EL-82-4. 14 pp.
772 National Oceanic and Atmospheric Administration (NOAA). 2008. *San Francisco Bay Project Impact Evaluation System—Pile Driving.* Coastal Restoration and Protection Division. Interactive GIS mapping software Website*:* http://mapping2.orr.noaa.gov/website/portal/pies/ naturalhistory.html. Accessed December 2, 2008.
773 National Marine Fisheries Service (NMFS). 2006. Fisheries Management Plan (FMP) Species Distributions In San Francisco, San Pablo and Suisun Bays. Website: http://swr.nmfs.noaa.gov/hcd/loclist.htm#South%20SF%20Bay. Accessed October 29, 2008.
774 National Marine Fisheries Service (NMFS). Essential Fish Habitat (EFH) for Pacific Coast Groundfish. Map dated July 26, 2008.



SOURCE: NOAA PIESWebsite, 2008, Merkel and Associates 2003 SF Bay eelgrass survey.

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FIGURE III.N-4

Candlestick Point — Hunters Point Shipyard Phase II EIR

PACIFIC HERRING SPAWNING HABITAT

- **Travel route**—A landscape feature (such as a ridgeline, drainage, canyon, or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources (i.e., water, food, cover, den sites). The travel route is generally preferred because it provides the least amount of topographic resistance in moving from one area to another. It contains adequate food, water, and/or cover while moving between habitat areas and provides a relatively direct link between target habitat areas.
- **Wildlife corridor**—A patch of habitat, usually linear in nature, that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bounded by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and facilitate movement while in the corridor.
- **Habitat linkage**—Larger, landscape-level movement features (often referred to as "habitat or landscape linkages") can provide both transitory and resident habitat for a variety of species to a more substantial, or wider, land connection between two habitat areas. Habitat linkages allow for the periodic exchange of animals between habitat areas, which is essential to maintain adequate gene pools.
- **Wildlife crossing**—A small, narrow area, relatively short in length and generally constricted in nature, that allows wildlife to pass under or through an obstacle or barrier that otherwise hinders or prevents movement. Crossings may be manmade and include culverts, underpasses, drainage pipes, and tunnels to provide access across or under roads, highways, pipelines, or other physical obstacles. These often represent "choke points" along a movement corridor.

Surveys of the Project site did not identify any major or regional wildlife corridor/travel route. The Project site is surrounded by open water and urban development that isolate habitats in the Study Area from large expanses of similar habitats in undeveloped areas elsewhere along the San Francisco Bay shoreline and in the San Bruno Mountain State Park (approximately 2 miles to the southwest). There is localized movement, as ground-dwelling animals forage for food, mate, and move between habitat patches within the Project site. Although there is localized movement between Bayview Hill and the CPSRA, Bayview Hill is also isolated from larger expanses of habitat, and movement by mammals, reptiles, and amphibians between the site and any larger expanses of natural habitat (such as San Bruno Mountain to the southwest) is severely impeded by US-101 and other roads and urban development.

In addition, although bird flyways are not traditionally considered "wildlife movement corridors," the San Francisco Bay's wetlands and tidal lands serve as important habitat for bird species during migration through the Pacific Flyway. Many bird species use these areas as an annual stopover location for several days of rest and feeding prior to continuing migration. These habitats also provide critical staging areas for migratory species. Thus, the Study Area is a minor, but important component of the much larger Bay system that provides habitat for migratory birds.

III.N.3 Regulatory Framework

Federal

Section 404 of the Clean Water Act

Section 404 of the *Clean Water Act* (CWA) (33 *United States Code* [USC] §§ 1344) requires that a permit be obtained from the USACE prior to the discharge of dredged or fill materials into any "waters of the United States or wetlands." Waters of the United States are broadly defined in the USACE regulations to include

navigable waterways, their tributaries, lakes, ponds, and wetlands. Wetlands are defined as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that normally do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."[775] Wetlands that are not specifically exempt from Section 404 regulations (such as drainage channels excavated on dry land) are considered to be "jurisdictional wetlands." The USACE is required to consult with the USFWS, NMFS, Environmental Protection Agency, and State Regional Water Quality Control Board (SWRCB) in carrying out its discretionary authority under Section 404.

The USACE grants three types of permits: individual, general, and nationwide. Project-specific individual permits are required for certain activities that may have a potential for more than a minimal impact and necessitate a detailed application. A permit from the USACE would be required for any placement of fill in waters of the US as part of the Project.

Section 402 of the Clean Water Act

The primary mechanism in the CWA regulating the discharge of pollutants is the National Pollutant Discharge Elimination System (NPDES), which is administered by the Environmental Protection Agency (EPA). Under the NPDES program, a permit is required from EPA or an authorized state for the discharge of any pollutant from a point source into the waters of the US (33 USC §§1342). Storm water pollution prevention plans must be prepared for construction activities as part of the NPDES permitting process.

Section 401 of the Clean Water Act

Section 401 of the CWA (33 USC §§ 1341) requires a state-issued Water Quality Certification for all projects requiring a Section 404 permit, or other federal permit or license. There are nine Regional Water Quality Control Boards (RWQCBs) across the state that issue Water Quality Certifications for various actions within their respective region. The RWQCB, San Francisco Bay Region, issues Section 401 Water Quality Certifications for the City and County of San Francisco. A Section 401 certification requires a determination that the Project will comply with all state water quality standards.

Federal Endangered Species Act (FESA)

The FESA was enacted in 1973. Under the FESA, the Secretary of the Interior and the Secretary of Commerce have the authority to list a species as threatened or endangered (16 USC 1533[c]). The FESA is administered by both the NMFS and the USFWS. The NMFS is accountable for animals that spend most of their lives in marine waters, including marine fish, most marine mammals, and anadromous fish such as Pacific salmon. The USFWS is accountable for all other federally listed plants and animals.

Pursuant to the requirements of FESA, a federal agency authorizing, funding or carrying out a project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present within the Study Area and determine whether the agency's action could affect any federally listed species (16 USC 1536(a)(2), (3).) If the action would likely affect a listed species, the agency must consult with the USFWS or NMFS under Section 7 of the FESA to determine whether the action is likely

[775] US Army Corps of Engineers, *Definition of Waters of the United States*, 33 CFR 328, November 1986.

to jeopardize the continued existence of the species or result in the destruction or adverse modification of designated critical habitat (16 USC 1536(a)(2).) Project-related adverse effects to these species or their habitats are typically considered significant under CEQA and thus would require mitigation.

The USFWS Regional Office in Sacramento maintains a list of "species of concern" that receive special attention from other federal agencies (i.e., NMFS) during environmental review, although they are not protected under FESA. Project-related impacts to such species could be considered significant under CEQA Guidelines section 15380 and could require mitigation.

Section 9 of the FESA prohibits any person or federal agency from "taking" endangered or threatened wildlife. The definition of "take" includes harassing, harming, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct. A notable component of this definition is the definition of "harm." "Harm" in the definition of "take" means an act that actually kills or injures protected wildlife. Such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering.

Projects that would result in "take" of any federally listed threatened or endangered species are required to obtain incidental take authorization from NMFS or USFWS through either the Section 7 (interagency consultation) process described above or Section 10(a) (incidental take permit) of FESA. The Section 7 authorization process is used to determine if a project with a federal nexus would jeopardize the continued existence of a listed species and what mitigation measures would be required to avoid jeopardizing the species. The Section 10(a) process allows take of endangered species or their habitat when no other federal government action is involved. Because the Project could affect a federally listed species and would require a federal (Section 404) permit, pursuant to Section 7 of the FESA, the USACE must initiate consultation with USFWS or NMFS prior to carrying out its discretionary authority under Section 404 of the CWA.

Migratory Bird Treaty Act (MBTA)

The federal *Migratory Bird Treaty Act* (MBTA; 16 USC, Sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading in any native bird that may occur within the Study Area except in accordance with regulations prescribed by the Secretary of the Interior. It is an international treaty for the conservation and management of bird species that migrate through more than one country, and is enforced in the United States by the USFWS. This act encompasses whole birds, parts of birds, and bird nests and eggs and provides protection to over 800 species in the United States. All native birds in the Study Area are protected by the MBTA.

Marine Mammal Protection Act

The *Marine Mammal Protection Act* (MMPA) was enacted in 1972 and amended through 2007(16 USC 1631). All marine mammals are protected by the MMPA, which prohibits their take in US Waters. Take is defined in the MMPA as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect" [16 USC 1631 Section 3(13)]. This is a slightly different definition than the FESA, which also encompasses "attempts" to engage in these activities. Under the MMPA, "harassment" is further defined as any action that of pursues, torments, or annoys a marine mammal and which has the potential to injure or disturb a marine mammal or marine mammal stock in the wild including alteration of behavior patterns including migration, breathing, nursing, breeding, feeding, or sheltering [16 USC 1631 Section 3(18(A))].

Species that occur within San Francisco Bay on a regular basis that are protected by the MMPA include the harbor seal and the California sea lion. The MMPA would apply to the Project, because in-water construction activities such as pile driving could harass these animals.

Magnuson-Stevens Fisheries Conservation Act and Management Act

The NMFS has the authority to implement the *Magnuson-Stevens Fisheries Conservation and Management Act* (Public Law 94-264; MSA). The *Magnuson-Stevens Act* (MSA) was amended and reauthorized on January 12, 2007, by the *Magnuson-Stevens Fisheries Conservation and Management Reauthorization Act* (PL 109-479). The MSA was put into place to promote conservation and management of the Nation's fishery resources. The MSA established the Pacific Fishery Management Council, which was tasked with creating the Pacific Coast Groundfish Fishery Management Plan (FMP).[776] The most recent amendment to the FMP was adopted by NMFS in May 2006.[777] The FMP develops recommendations for the management of groundfish fisheries, and in some cases, it contains specific fishery management recommendations. [778] In addition, the FMP addresses provisions in the MSA relating to EFH to ensure that fishery resources are managed through the regulation of EFH. The MSA defines EFH as "... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" [16 USC 1802 MSA Section 3(10)]. The terms in this definition have been further defined to include:[779]

- Aquatic habitat and associated physical, chemical, and biological properties that are used by fish (historically used areas may be included)
- Sediment, stream substrates, instream structure, and associated biological communities
- The habitat required to support a sustainable fishery including that particular species' place in a properly functioning ecosystem
- The habitat required to support a full life cycle for the species under consideration

The tidal aquatic habitats adjacent to the Project site are considered EFH by NMFS for a species assemblage that includes anchovies, sardines, rockfish, sharks, sole, and flounder.[780,781] Areas supporting the native Olympia oyster found in San Francisco Bay are also considered EFH by NMFS because oyster beds generally increase fish abundance. In addition, eelgrass beds are considered EFH. The NMFS consults with federal action agencies under the MSA in a process similar and often parallel to the Section 7 FESA consultation. Because the Project would modify designated EFH, consultation with NMFS under the MSA is anticipated and would be initiated by the USACE during the permitting process for the Project.

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776 PFMC (Pacific Fisheries Management Council) 2006. *Pacific Coast Groundfish Fishery Management Plan as revised through Amendment 19* (March 2006).

777 National Marine Fisheries Service (NMFS). 2006. *Magnuson-Stevens Act Provisions; Fisheries off West Coast States; Pacific Coast Groundfish Fishery: Final Rule*. 71 FR 27408.

778 National Marine Fisheries Service (NMFS). 2006. *Magnuson-Stevens Act Provisions; Fisheries off West Coast States; Pacific Coast Groundfish Fishery: Final Rule*. 71 FR 27408.

779 Pacific Fisheries Management Council (PFMC) 2003. *Pacific Coast Salmon Plan – Fishery management plan for commercial and recreational salmon fisheries off the coast of Washington, Oregon, and California as revised through Amendment 14* (adopted March 1999).

780 National Marine Fisheries Service (NMFS). 2006. Fisheries Management Plan (FMP) *Species Distributions In San Francisco, San Pablo and Suisun Bays*. Website: http://swr.nmfs.noaa.gov/hcd/loclist.htm#South%20SF%20Bay. Accessed October 29, 2008.

781 National Marine Fisheries Service (NMFS).Essential Fish Habitat (EFH) for Pacific Coast Groundfish. Map dated July 26, 2008.

Section 10 of the Rivers and Harbors Act of 1899

Section 10 of the *Rivers and Harbors Act of 1899* (33 USC 403) gives the USACE jurisdiction over tidal waters of the US from the MHW elevation seaward (33 USC 403.382.4b). Specifically, it prohibits the construction, dredging, or fill of any navigable water without a permit from the USACE. This includes construction of breakwaters or marinas, installation of pilings, docks, or bridges, and excavation of existing substrates.

The Project would require placement of fill for bridge construction, shoreline revetments, breakwaters, installation of pilings and marina floats, and installation of gangways for access to the docks. All of these activities would be subject to the USACE jurisdiction under Section 10 of the *Rivers and Harbors Act*, and USACE authorization of these activities must be obtained through the permitting process for the Project.

State

California Endangered Species Act (CESA)

The CESA was enacted in 1984. Under the CESA, the California Fish and Game Commission has the responsibility for maintaining a list of threatened and endangered species. Pursuant to the requirements of CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the Study Area and determine whether the Project would have an adverse effect on such species. In addition, CDFG encourages informal consultation on any project that may impact a candidate species. Peregrine falcons nest within the Study Area, as noted above, and are listed as endangered under the CESA, although the species is proposed to be delisted.

Section 2080 of the *California Fish and Game Code* prohibits "take" of any species that the commission determines to be an endangered species or a threatened species. Take is defined in Section 86 of the *California Fish and Game Code* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Sections 2081(b) and (c) of the *California Fish and Game Code* allow CDFG to issue an incidental take permit for a state-listed threatened or endangered species only if specific criteria are met, such as take incidental to an otherwise lawful activity. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species populations and their essential habitats.

Fish and Game Code—Sections 1602, 3503, 3503.5, 3511, 3513, 4150, 4700, 5050, and 5515

California Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the code. Birds of prey are further protected under *California Fish and Game Code* Section 3503.5, which states that "it is unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird, except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered take by CDFG. Similarly, Section 4150 of the *California Fish and Game Code* describes protections for nongame mammals.

California Species of Special Concern is a designation used by the CDFG for some declining wildlife species that are not state candidates for listing as threatened or endangered. This designation does not provide legal protection but signifies that these species are recognized as having special status by the CDFG. Under CEQA Guidelines (Section 15380), potential impacts to these species must be assessed.

California laws relating to Fully Protected species (i.e., Section 3511) were among the first attempts in the nation to provide additional protection to animals that were rare or faced possible extinction, predating even the FESA. Most fully protected species have also been given additional protection under more recent laws and regulations, and many have been listed under state and federal versions of the FESA. Fully Protected species (such as the peregrine falcon and white-tailed kite) may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Four sections of the *California Fish and Game Code* list 37 fully protected species (*California Fish and Game Code* Sections 3511, 4700, 5050, and 5515). Each of these statutes (1) prohibits take or possession "at any time" of the species listed in the statute, with few exceptions, (2) states that no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to "take" the species, and (3) states that no previously issued permits or licenses for take of the species "shall have any force or effect" for authorizing take or possession.

Section 1602 of the *California Fish and Game Code* requires a Streambed Alteration Agreement for any activity that may alter the bed and/or bank of a lake, stream, river, or channel. Typical activities that require a Streambed Alteration Agreement include excavation or fill placed within a channel, vegetation clearing, structures for diversion of water, installation of culverts and bridge supports, cofferdams for construction dewatering, and bank reinforcement. A Streambed Alteration Agreement would be required as part of the permitting process for this Project.

Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* (California Water Code Sections 13000 et seq.) charges the SWRCB and the nine RWQCBs statewide with protecting water quality throughout California. Typically, the SWRCB and RWQCB act in concert with the USACE under Section 401 of the *Clean Water Act* in relation to permitting fill of federally jurisdictional waters. The US Supreme Court has acted to limit the regulatory jurisdiction of the USACE under Section 404 of the *Clean Water Act*.[782] This action did not limit the State's regulatory jurisdiction over Waters of the State.[783] Waters of the State are defined in Section 13050(e) of the *Porter-Cologne Water Quality Control Act* as "…any surface water or groundwater, including saline waters, within the boundaries of the state."

Wetlands are delineated in accordance with methodology presented in the 1987 *Corps of Engineers Wetlands Delineation Manual*[784] and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West*

[782] United States Supreme Court (USSC), *Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers*. 531 US 159(2001), also known as the "SWANCC decision."
[783] Guzy, G.S. and R.J. Andersen., *Memorandum from the Corps regarding: Supreme Court ruling concerning CWA jurisdiction over isolated waters.* Website: http://www.spn.usace.army.mil/regulatory/ swancc.pdf, 2001.
[784] Environmental Laboratory*, Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87-1, US Army Engineer Waterways Experiment Station. Vicksburg, Miss., 1987.

Region.[785] Applicants have this delineation verified by the USACE and, in cases where an area meets the criteria to be considered a wetland, but the USACE does not have jurisdiction, the applicant is referred to the appropriate RWQCB. For the Study Area, the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) could exercise its jurisdiction over wetlands where a project does not require a federal permit, but involves removal or placement of material into Waters of the State. The USACE has indicated that the waters and wetlands potentially impacted by the Project are subject to its jurisdiction. A Section 401 clean water certification or waiver would be required as part of the permitting process for this Project.

The McAteer-Petris Act (California Government Code 66600–66682)

The *McAteer-Petris Act* created the San Francisco Bay Conservation and Development Commission (BCDC) in 1965. BCDC's mission is the preservation of San Francisco Bay from indiscriminate filling. BCDC's first task was compilation of a comprehensive study of the Bay and determination of how future development of the Bay should occur. This effort resulted in the San Francisco Bay Plan in 1968. In 1969 the findings and policies of the Bay Plan were incorporated into the *McAteer-Petris Act*, which was amended making BCDC a permanent state agency. The Bay Plan continues to evolve and remains the guiding document for BCDC's actions. Section 66610 of the *McAteer-Petris Act* establishes the boundaries of San Francisco Bay in relation to BCDC's jurisdiction. Essentially, all areas below the mean high tide line and an area within a shoreline band that extends landward for 100 feet from the mean high tide line are subject to their jurisdiction. Section 66632 of the *McAteer-Petris Act* establishes the permitting process for projects that would place fill in, on, or over any part of BCDC's jurisdiction as defined in Section 66610. Some aspects of the Project would be in the water or within the shoreline band and, therefore, subject to BCDC's jurisdiction.

■ Regional

Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) Management Plan

In 1999, under the authority of the federal FESA, NOAA Fisheries and the USFWS, and the CDFG, under the CESA, completed a programmatic consultation for the Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) Management Plan[786]. NOAA Fisheries, USFWS and CDFG concluded that the LTMS program was not likely to jeopardize the continued existence of listed species under their jurisdiction. The respective biological opinions provided an incidental take statement, which authorized the take of listed species that may inadvertently occur during dredging and dredged material disposal activities that adhere to the environmental work windows set forth in the LTMS Management Plan. Therefore, permitted dredging activities that conform to the Environmental Work Windows can be completed without the need to consult with the resource agencies under the FESA and the CESA. Any project proposing to conduct dredging activities outside of the LTMS environmental work windows is required to undertake either informal or formal consultation with the appropriate resource agencies (NOAA Fisheries, USFWS, and CDFG).

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[785] US Army Corps of Engineers, *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, Wetlands Regulatory Assistance Program, Vicksburg, Miss., September 2008.
[786] LTMS Environmental Work Windows Work Group. LTMS Informal work windows, Informal consultation preparation packet. Draft version 1.4. February 2004. Website: http://www.spn.usace.army.mil/conops/informal.pdf.

San Francisco Bay Trail Plan

Refer to Section III.A Land use and Plans for a description of the Bay Trail Plan. Environmental Protection Policies relevant to the Project are listed below.

Environmental Protection Policies[787]

23. The Committee is aware of the ecological value of wetlands; in many cases, they provide habitat for a variety of endangered species. In the San Francisco Bay Area, these areas serve as a vital link in the Pacific flyway for feeding, breeding, nesting and cover for migratory birds. To avoid impacts in wetlands habitats, the Bay Trail should not require fill in wetlands, and should be designed so that use of the trail avoids adverse impacts on wetland habitats.
24. Future support facilities serving the Bay Trail should be designed and constructed in such a manner that they do not impact fish and wildlife resources, especially wetlands. These facilities should be located and designed in a way that no fill of wetlands will be required.
26. The path will not always follow the Bay shoreline; inland reaches may be more appropriate, especially for bicycle travel, in some parts of the San Francisco Bay region.
28. Where the alignment of the Bay Trail may more appropriately be located away from the shoreline in order to protect particularly sensitive habitats, access to shoreline areas may be possible by connecting the Bay Trail to existing loop trails and other interpretive facilities. These access points should be planned and designed to make clear the distinction between the continuous Bay Trail and the interpretive trail. (Features may include different trail surfaces, marked entry points to interpretive areas, expanded facilities for education and shoreline interpretation, signage, regulation and enforcement of regulations.)
29. Provision of land or funds for Bay Trail planning or construction shall not be considered mitigation for wetland losses.

Candlestick Point State Recreation Area General Plan

Refer to Section III.A Land Use and Plans for a description of the CPSRA GP. The following excerpt is related to natural resource management:[788]

> It is the policy of the department to protect the scenic values and to enhance, manage, and protect the biotic and natural resources of the area, while fully realizing the potential of the area for fulfillment of outdoor recreation needs. A wetland restoration and management plan shall be developed for the area north and east of the extension of Yosemite Avenue to the Bay, an area known as the Nature Area. The plan shall include provisions for natural restoration and removal of debris, design of a shoreline configuration that provides a healthy intertidal action, revegetation, and wildlife habitat enhancement. This plan shall be developed in coordination with local, Bay protection, and wildlife agencies.

San Francisco Bay Plan

Refer to Section III.A Land Use and Plans for a description of the Bay Plan. A summary of the policies related to biological resources are provided below.

[787] Bay Trail Plan. 1999. Electronic file: http://baytrail.abag.ca.gov/baytrailplan.html#designguidelines. July 30.
[788] State Department of Parks and Recreation. Candlestick Point State Recreation Area General Plan, March, 1988.

Policies Concerning Fish, Other Aquatic Organisms and Wildlife in the Bay, Tidal Marshes and Tidal Flats Around the Bay, and Subtidal Areas in the Bay [789]

The SFBCDC shall protect native fish species, other aquatic organisms, other listed wildlife species and their specific habitats under the *California Endangered Species Act* or federal *Marine Mammal Protection Act* within the Bay's tidal marshes, tidal flats, and subtidal habitat. To the greatest extent feasible, specific habitats such as tidal marsh, tidal flats, and subtidal habitats shall be conserved, restored, and increased. Specific habitats that are needed to conserve, increase or prevent the extinction of any native species, species threatened or endangered, species that the CDFG has determined are candidates for listing as endangered or threatened under the California *Endangered Species Act*, or any species that provides substantial public benefits, should be protected, whether in the Bay or behind dikes. In reviewing or approving habitat restoration programs the SFBCDC should follow the recommendations in the Baylands Ecosystem Habitat Goals and provide a diversity of habitats for native aquatic and terrestrial plant and animal species. For projects that may adversely affect an endangered or threatened plant, fish, other aquatic organism or wildlife species the SFBCDC should consult and give appropriate consideration to the recommendations of the California Department of Fish and Game and the US Fish and Wildlife Service or the National Marine Fisheries Service and not authorize projects that would result in the "taking" of any plant, fish, other aquatic organism or wildlife species listed as endangered or threatened pursuant to the state or federal endangered species acts, or species that are candidates for listing under the CESA, unless the project applicant has obtained the appropriate "take" authorization from the US Fish and Wildlife Service, National Marine Fisheries Service or the California Department of Fish and Game. However, the SFBCDC may permit a minor amount of fill or dredging in wildlife refuges, shown on the Plan Maps, necessary to enhance fish, other aquatic organisms and wildlife habitat or to provide public facilities for wildlife observation, interpretation and education.

Policies Concerning Shoreline Protection around the Bay[790]

New shoreline erosion control projects and the maintenance or reconstruction of existing erosion control facilities should be authorized if *(a)* the project is necessary to protect the shoreline from erosion; *(b)* the type of the protective structure is appropriate for the project site and the erosion conditions at the site; and *(c)* the project is properly designed and constructed. Professionals knowledgeable of the Commission's concerns, such as civil engineers experienced in coastal processes, should participate in the design of erosion control projects.

Policies Concerning Dredging in the Bay[791]

Dredging and dredged material disposal should be conducted in an environmentally and economically sound manner. Dredgers should reduce disposal in the Bay and certain waterways over time to achieve the LTMS goal of limiting in-Bay disposal volumes to a maximum of one million cubic yards per year. The LTMS agencies should implement a system of disposal allotments to individual dredgers to achieve this goal only if voluntary efforts are not effective in reaching the LTMS goal. In making its decision regarding disposal allocations, the Commission should confer with the LTMS agencies and consider the need for the dredging and the dredging projects, environmental impacts, regional economic impacts, efforts by the dredging

[789] SFBCDC, San Francisco Bay Plan, Reprinted February 2008.
[790] Ibid.
[791] Ibid.

community to implement and fund alternatives to in-Bay disposal, and other relevant factors. Small dredgers should be exempted from allotments, but all dredgers should comply with the SFBCDC policies.

Local

Yosemite Slough Restoration Plan

The Yosemite Slough Restoration Plan (2005) was developed on behalf of the State Parks Department, in accordance with the CPSRA GP. The restoration of Yosemite Slough would create the largest contiguous wetland area in San Francisco. The restoration project would help restore essential wildlife habitat, improve water quality, and prevent erosion along the shoreline of the City—an area of the bay where tidal wetlands have been most impacted and suffered the greatest loss due to urbanization.

Goals and objectives of the restoration include the following:

- Increase the area subject to tidal influence by excavating three areas that were formerly part of San Francisco Bay.
- Restore habitat diversity by adding 12 acres of tidally influenced wetlands and marsh area and remove chemically impacted soils from upland areas to improve the quality of existing habitat.
- Improve habitat for special-status species (i.e., western snowy plover and double-crested cormorants) by creating two nesting islands.
- Improve the quality of life for the surrounding community by creating a clean, beautiful local park for viewing wildlife habitat.
- Create an environmental area that local schools can use for field trips.
- Connect to the Blue Greenway, an important effort to build 13 miles of Bay Trail along the southern waterfront of the San Francisco Bay Trail.

City of San Francisco General Plan

The following goals and policies related to biological resources protection are included in the Environmental Protection Element of the *San Francisco General Plan*, and are relevant to the Project:

<u>General</u>

Objective 1 Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.

- Policy 1.1 Conserve and protect the natural resources of San Francisco.
- Policy 1.2 Improve the quality of natural resources.
- Policy 1.3 Restore and replenish the supply of natural resources.
- Policy 1.4 Assure that all new development meets strict environmental quality standards and recognizes human needs.

<u>Bay, Ocean, and Shorelines</u>

Objective 3 Maintain and improve the quality of the bay, ocean, and shoreline areas.

- Policy 3.1 Cooperate with and otherwise support regulatory programs of existing regional, state, and federal agencies dealing with the Bay, Ocean, and Shorelines.

Policy 3.2 Promote the use and development of shoreline areas consistent with the General Plan and the best interest of San Francisco.

Land

Objective 7 Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the City's citizens.

Policy 7.3 Require that filling of land adhere to the highest standards of soils engineering consistent with the proposed use.

Flora and Fauna

Objective 8 Ensure the protection of plant and animal life in the City.

Policy 8.1 Cooperate with and otherwise support the California Department of Fish and Game and its animal protection programs.

Policy 8.2 Protect the habitats of known plant and animal species that require a relatively natural environment.

Policy 8.3 Protect rare and endangered species.

San Francisco Municipal Code

Urban Forestry Ordinance

The City provides protection for trees around the City by way of its Urban Forestry Ordinance (Ord. 165-95, App. 5/19/95), Article 16, Sections 806 (Planting and Removal of Street Trees) through 810 (Significant Trees) of the *Public Works Code*. "Significant trees" are defined as trees within 10 feet of a public right-of-way that also meet one of the following size requirements: 20 feet or greater in height; 15 feet or greater in canopy width; or 12 inches or greater diameter of trunk measured at 4.5 feet above grade. Among the factors considered in the removal of significant trees are the following: their size, age, and species; visual and aesthetic characteristics; cultural or historic characteristics; ecological and location characteristics. Street trees are also protected by the City's Urban Forestry Ordinance and both require a permit for removal. The ordinance also provides a process for designating trees as landmark trees, and protects significant, landmark, and street trees during construction activities. This ordinance applies to limited areas of the Project site where there are significant trees, street trees, and/or landmark trees.

Planning Code

Section 143 of the San Francisco Planning Code requires the installation of one street tree for each 20 feet of property frontage along each street or alley, with any remaining fraction of 10 feet or more of frontage requiring an additional tree for the owner or developer of a new or relocated building, or a building with 20% or more floor area expansion in specified districts.[792] This ordinance applies to the R, SPD, RSD, NC, C-3, DTR, MUG, MUO, MUR, UMU, SLR, SLI, and SSO Districts.

[792] Amended by Ord. 414-85, App. 9/17/85; Ord. 69-87, App. 3/13/87; Ord. 115-90, App. 4/6/90; Ord. 298-08, File No. 081153, App. 12/19/2008.

III.N.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to biological resources, but generally consider that implementation of the Project would have significant impacts if it were to:

N.a Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

N.b Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS.

N.c Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

N.d Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

N.e Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

N.f Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Analytic Method

As mentioned in Section III.N.2 (Setting), PBS&J staff biologists reviewed existing studies of the Project site and conducted reconnaissance-level surveys of the Project site on August 9, 2007, May 5, 2008, and July 8, 2008.

The analysis provided below considers the potential direct, indirect, and cumulative effects of construction and implementation of the Project described in Chapter II, including both on-site and off-site impacts. Potential impacts are analyzed using information identified in Chapter II, the environmental setting for biological resources, results of literature and field surveys, and the adequacy of on-site habitat for potentially occurring special-status species, and comparing this information to the Significance Criteria that were identified in the previous section. In general, impacts are separated by plan element (i.e., Candlestick Point and HPS Phase II) and are indicated by an "a" and "b," respectively, in the impact number. In addition, several impacts contain separate discussions of the proposed bridge over Yosemite Slough.

Identifying the impacts to biological resources that would result from construction of the CP/HPS Project is complicated by the fact that future remediation activities would modify existing site conditions before some CP/HPS Project components are constructed. As a result, the "baseline conditions" for the purpose of the Settings section above (i.e., existing conditions observed during field surveys conducted in the preparation of this EIR, plus other data collected or research conducted within the Study Area since 2003) are not necessarily the conditions that would be present when Project components are constructed. For example, on Parcels E and E-2, it is expected that remediation by the Navy would result in the removal

and/or capping of contaminated materials and construction of a shoreline revetment that would prevent erosion of materials on these parcels. These remediation activities (including revetment construction) would result in impacts to most of the wetlands that have been identified on Parcels E and E-2. As mitigation of these impacts, the Navy has proposed constructing new wetlands in the southwestern portion of HPS after remediation efforts are completed. Although the CP/HPS Project may construct the Yosemite Slough bridge and its approaches before the Navy's remediation efforts are concluded, other portions of Parcels E and E-2 are not expected to be improved as part of this Project until the Navy has completed its removal of radiological contamination. As a result, when CP/HPS improvements are made, wetlands on Parcels E and E-2 may be limited to the Navy's wetland mitigation site, with the remaining wetlands impacted by the Navy's fill and the revetment. To adequately characterize the impacts of the CP/HPS Project to biological resources, impacts to potentially affected resources (such as wetlands) are analyzed under two scenarios: assuming construction of Project improvements occurs prior to completion of Navy remediation activities, and assuming Navy remediation occurs first.

Impacts to special-status species would be significant (in the absence of mitigation) if the Project would adversely affect any of the following: (1) a species listed as threatened or endangered by the state or federal government at the time the Draft EIR is published; (2) a major population or subpopulation of a species that would result in the regional decline of this species; (3) a relatively large number of individuals within a population that is considered rare or declining; (4) a species' metapopulation (i.e., if one of only a few known populations occurs in the impact zone, or if the species has extremely narrow habitat requirements); or (5) a habitat type or vegetation community in regional decline or that is regionally endemic and is recognized as such by the local, state, or federal agencies identified in the Setting section. As discussed in the Setting section, those species or habitats with a "Not Likely," or "Absent" likelihood of occurrence in Table III.N-5 will not be addressed further as they are not expected to occur on the site or be affected by the Project.

Impacts to sensitive or rare species would be less than significant, even without mitigation, if they are not expected to substantially affect species or populations because (1) a relatively small number of non-listed individuals would be impacted; (2) the number of individuals of a non-listed species to be impacted represent a very small fraction of regional populations due to the species' regional abundance; (3) recovery and conservation efforts are documented to adequately conserve the species or habitat, and impacts would not affect the recovery or conservation of this species or habitat; or (4) the species or habitat is locally common and fairly abundant in the region.

This section presents Project Impacts at the conclusion of the discussion of individual impacts at Candlestick Point and HPS Phase II, beginning with Impact BI-22 and concluding with Impact BI-26.

Construction Impacts

Impact BI-1: Regional Conservation Plans

Impact BI-1 **Implementation of the Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. (No Impact) *[Criterion N.f]***

There are no adopted Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plans that cover the Study Area. Therefore, the Project would not conflict with a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Consequently, no impact to such plans would occur. No mitigation is required.

Impact BI-2: Common Species and Habitats

Impact BI-2 **Implementation of the Project would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats through substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant) *[Criterion N.d]***

As listed in the Setting section, numerous common plant and wildlife species occupy the Study Area. Common wildlife includes a number of species of invertebrates, reptiles and amphibians, birds, and mammals (terrestrial and aquatic). Common aquatic resources include many species of fish, shellfish, and mollusks. Common plant communities include non-native annual grassland and landscaped areas/ornamental plants. Common species and habitats would be affected through the removal and construction of buildings, removal of trees, shoreline improvements, installation of trails, roads, and other facilities, construction and operation of the stadium and Yosemite Slough bridge, increased foot and vehicular traffic, installation of towers, and operation of stadium lights. In addition, an increase in trash, particularly food waste, could potentially subsidize nuisance species such as common ravens (*Corvus corax*), American crows (*Corvus brachyrhynchos*), raccoons, rats, and feral cats, which in turn could increase predation on more sensitive wildlife species. As a result, some common habitats would be reduced in extent, and some common species would decline in abundance as a result of the Project. However, the Project's impact to common species and habitats would not be substantial. These species/habitats are abundant throughout the San Francisco Bay region, and the Project site supports an extremely small proportion of the regional abundance of these resources. Further, the abundance of many of these species on the Project site itself is relatively low due to the extent of developed/urban land uses on the site, the long history of disturbance of the site, the intensive nature of such disturbance in some areas (e.g., where remediation activities on HPS are occurring or have recently occurred), and the site's isolation from more extensive areas of natural habitat by the Bay and by urban development in surrounding areas. Those species that are present on the site in higher numbers consist primarily of species that are well adapted to urban or heavily disturbed areas. Consequently, any impacts of the Project on common species and habitats would have a negligible effect on regional population and would thus be less than significant. No mitigation is required.

The habitat disturbance caused by the Project would result in a less-than-significant impact to regionally common species and habitats, and, in addition, the Project proposes multiple measures to further avoid and minimize impacts to common vegetation communities and wildlife species, and to enhance habitat conditions for a number of species, such as migratory birds. Specifically, the Project includes implementation of a Draft Parks, Open Space, and Habitat Concept Plan[793] (provided in Appendix N3 [Draft Parks, Open Space, and Habitat Concept Plan] to this EIR) that would take advantage of opportunities for enhancing the ecological functions and values of the parks and open space areas on the Project site. These enhancement measures would focus on areas outside the CPSRA, since the Project would neither impact directly, nor have control over enhancements in, the portion of the CPSRA that is not subject to the land transfer agreement. However, the Draft Parks, Open Space, and Habitat Concept Plan would suggest enhancements that would provide ecological benefits within the CPSRA, should State Parks decide to implement them. Some of the measures that would be included in the Draft Parks, Open Space, and Habitat Concept Plan, and that would be implemented on the Project site, include:

- **Control of non-native invasive species:** The Project site is currently dominated by non-native plants, and several are particularly invasive, having the potential to expand over large areas and significantly reduce the ecological value provided by the proposed habitat enhancements. Invasive, non-native species would be removed during initial habitat enhancement efforts, and monitoring and ongoing removal/control would be implemented to ensure against the re-establishment and spread of these species on the Project site.
- **Restoration of grasslands:** To maintain grassland-associated wildlife species on the site, grasslands extensive enough to support such species would be maintained and enhanced through the restoration of native grasses. Such grassland habitat would not be well manicured or regularly mown. No trees would be planted within designated grassland management areas, and shrub cover would be limited to a few small, scattered patches of low-statured coastal scrub plants, which will provide cover for wildlife that may otherwise forage in the grasslands. Native-dominated grassland habitat would be created, which would result in a net gain for the site.
- **Increase in tree/shrub cover:** Numerous trees (approximately 10,000 net new trees, which is more than four times the number currently present on the Project site) and shrubs (particularly natives) would be planted and maintained to provide cover for mammals, reptiles, and amphibians and enhance habitat suitability for birds. The trees would be planted at the Project site and in the community, and the shrubs would be planted at the Project site. Trees and shrubs would be particularly beneficial as foraging habitat for Neotropical and other long-distance migrant birds. Increases in foliage height diversity and vegetation volume resulting from the planting of numerous trees and shrubs on the site, most of which currently supports little woody vegetation, would result in increases in the diversity and abundance of breeding and migratory birds. While native vegetation shall be favored, site-appropriate non-native trees and shrubs that provide food or structural resources that are particularly valuable to native wildlife may also be considered.
- **Maintenance of habitat connectivity:** Roads, trails, and buildings would interrupt habitat connectivity to some extent. However, park planning and maintenance/landscaping of open space areas can maintain connectivity within the site for less mobile animals such as mammals, reptiles, and amphibians through the wildlife-friendly design of potential obstacles (i.e., fences, walls, and curbs), maintenance of a vegetated band along the shoreline, and planting of vegetative cover that provides refugia for dispersing animals.

[793] Lennar Urban, *Draft Parks, Open Space, and Habitat Concept Plan,* November 2009.

- **Maintenance of refugia for waterbirds:** In planning for future trails, vistas, and other features/facilities expected to concentrate human activities along the waterfront, at least one shoreline area where waterbirds can roost at high tide would remain removed from trails or other shoreline access points for humans. In addition, the bases of the three piers in the southeastern corner of HPS Phase II would be removed to prevent mammals from accessing these piers, and the piers would be left in place to provide roosting sites for gulls, cormorants, pelicans, and terns.
- **Provision of nest boxes:** Nest boxes for birds would be placed in appropriate locations throughout parks and open space areas.

With implementation of the Draft Parks, Open Space, and Habitat Concept Plan, many wildlife species would benefit from the removal of invasive species, enhancement, restoration, and management of habitats such as grasslands and wetlands, and the planting of numerous trees and shrubs in areas that are currently highly degraded or disturbed. Specifically, extensive planting of native vegetation would enhance the vegetation community and provide areas of enhanced habitat for common butterflies, birds, small mammals, reptiles, and amphibians on the Project site. For most species, the benefits of such enhancements would accrue to local, rather than regional, populations, as there is no substantive dispersal of most wildlife species between the site and off-site areas. However, in the case of migratory birds, the Project would result in a net benefit that would have regional or Flyway-level implications, as the Project would enhance foraging habitat that is used by birds breeding and wintering in areas far from the Study Area. Further, the Draft Parks, Open Space, and Habitat Concept Plan would identify enhancement opportunities within open space areas that can be beneficial to other common species or habitats. A discussion of potential effects of the Project on common species by wildlife type is included below.

Invertebrates

Of 14 butterfly species recorded on the Project site during the Yosemite Slough Watershed Wildlife Survey, 13 species are common and widespread and are associated with host plants that are also widespread. These butterflies would benefit from increased habitat and foraging opportunities within the proposed native habitats and landscaping plantings as a result of the Project. The western pygmy blue, which was recorded infrequently (no more than one individual on a given survey), is associated with salt marshes and is, therefore, of more limited distribution. Nevertheless, this species is found in salt marshes throughout the San Francisco Bay area and was recorded very infrequently during the Yosemite Slough Watershed Wildlife Survey. As a result, the Project would have a negligible effect on regional populations of the species, and impacts to this and other butterfly species would be less than significant. The Project would maintain and enhance habitat for the pygmy blue through restoration, creation, or enhancement of salt marsh habitat along the shoreline. As a result of salt marsh restoration on the outboard side of revetments on portions of Candlestick Point and HPS Phase II, the Project is expected to create at least as much salt marsh habitat as it impacts.

Reptiles and Amphibians

The Project would maintain habitat for all five of the reptiles (southern alligator lizard, western fence lizard, gopher snake, ring-necked snake, and western garter snake) and the single amphibian (California slender salamander) recorded on the Project site by the Yosemite Slough Watershed Wildlife Survey. Providing additional ground cover (i.e., shrubs) would improve habitat in some areas, especially in HPS Phase II, which has been subjected to intensive disturbance from remediation efforts.

Local abundance of these species may decline in some areas due to a reduction in dispersal (resulting from trails, roads, and increased vehicular traffic and human presence) and possibly increased vehicular mortality, but all six of these species are regionally abundant, and the Project's impacts would have a negligible effect on regional populations. In addition, the new and improved parkland components of the Project would provide new and/or enhanced habitat for reptiles and amphibians, which would be a localized beneficial impact in portions of the site.

Birds

Of 118 bird species observed during the Yosemite Slough Watershed Wildlife Survey, 51 (43 percent) were represented by a maximum count (the maximum number of individuals recorded on a given survey) of 5 or fewer, and thus use the Project site in low numbers. The most abundant wildlife species recorded were waterbirds. Project impacts to waterbird habitat within the Yosemite Slough bridge footprint would be mitigated by restoration on site or off site, as discussed under mitigation measure MM BI-4a.1 below. Increased human use of the Project site may reduce abundance in aquatic habitats along the immediate shoreline, but ample aquatic habitat is present around the Project site, and, even without restoration, no substantial changes in common waterbird abundance (particularly relative to regional populations) are expected as a result of the Project.

Of the 57 species of landbirds recorded, only 20 were represented by maximum counts of 10 or more, indicating that most landbirds use the study area only in low numbers. In addition, most of these species are regionally abundant species adapted to a variety of habitat types, including the disturbed, non-native dominated habitats that currently occupy most of Candlestick Point and HPS Phase II. Although many landbird species would increase in abundance due to the provision of much more extensive trees and shrubs than are currently present, a few regionally abundant landbirds associated with extensive grasslands and weedy areas (such as meadowlarks and wintering grassland sparrows) may fluctuate in abundance within the Project site. However, incorporation of grasslands in open space areas and restoration of suitable foraging habitat on portions of the Project site would maintain habitat for these species on the site by ensuring that there is habitat for small birds, reptiles, mammals, and insects, which are the primary prey for the locally occurring raptor species.

The Project would result in a net benefit to many avian species. The Project would include approximately 105 acres and 232 acres of parkland and open space improvements at Candlestick Point and HPS Phase II, respectively. Although portions of this parkland may serve primarily recreational purposes, parks in the Project area would provide an opportunity for planting of trees and shrubs that would be used by numerous birds. For example, the 82-acre[794] Grasslands Ecology Park on the southern portion of HPS would be designed and landscaped to provide a variety of habitats, including extensive grasslands as well as a mosaic of trees, shrubs, and other vegetation. A Draft Parks, Open Space, and Habitat Concept Plan, which is required by mitigation measure MM BI-7b below, would include the planting of approximately 10,000 net new trees (more than four times the number currently present in the Project area), in addition to shrubs and other vegetation, which would serve as perching, roosting, nesting, and foraging sites for a variety of birds. The trees would be planted at the Project site and in the community, and the shrubs would be planted

[794] This acreage reflects the area of parklands that would be suitable for on-site species, and represent only a portion of the total new park lands that would be created by the Project.

at the Project site. These new and improved Project components would provide both raptor foraging opportunities and enhanced habitat for certain raptor prey species that could result in higher prey base for raptors. Some waterbirds (i.e., gulls, terns, cormorants, and pelicans) would benefit from the enhanced roost sites offered by the proposed three piers, which would provide nesting and roosting sites that would no longer accessible to mammalian predators. Neotropical and other long-distance migrants, the landbird group using the site that is of greatest conservation concern, would receive a considerable net benefit from the Project. Increases in foliage height diversity and vegetation volume resulting from the planting of numerous trees and shrubs on the site, most of which currently supports little woody vegetation, would result in increases in the diversity and abundance of both breeding and migratory birds.[795,796,797] Well-vegetated sites nearby, such as Golden Gate Park and Coyote Point, provide much higher density and structural diversity of vegetation than is currently present on HPS Phase II and most of Candlestick Point, and these locations are known by birders to support high species diversity and abundance of birds, including Neotropical and other long-distance migrants.[798] With the Project's revegetation component and addition of new parklands, the Project would provide a net enhancement of breeding, wintering, and migratory stopover habitat for birds.

Mammals

Of the ten mammal species recorded in the Study Area during the Yosemite Slough Watershed Wildlife Survey, three are non-natives (domestic dog, domestic cat, and Norway rat); two are common urban-adapted species (raccoon and striped skunk); and one occurs infrequently in aquatic areas (harbor seal). Of the remaining four species, the Botta's pocket gopher and California vole were represented by no more than one individual on a given survey and thus may be uncommon on the site. These two species, and the California ground squirrel and black-tailed jackrabbit, may decline in abundance on portions of Candlestick Point as extensive weedy/grassland habitats are converted to a mosaic of uses and habitats. However, numbers of these species in open space in HPS Phase II are currently expected to be low due to disturbance from remediation efforts, and enhancement and management of grassland habitat in this area may increase numbers of these species there. Specifically, habitat values on southern HPS Phase II, which has been heavily impacted by remediation efforts, would be enhanced considerably by management of a diverse mosaic of habitats, including native-dominated grasslands and patches of native and site-appropriate trees and shrubs. This area would, therefore, provide new and substantially improved habitat that small mammals can utilize and occupy.

Over time, numbers of some of these small-mammal species may decline due to a reduction in dispersal between patches of suitable grassland habitat and increased urbanization, but all of the terrestrial mammals on the site are regionally abundant and the reduction in their numbers within the site would have a negligible effect on regional populations. The Project would include approximately 105 acres and 232 acres of parkland and open space improvements on Candlestick Point and HPS Phase II, respectively. Although portions of this parkland may serve primarily recreational purposes, parks in the Project area would provide

795 MacArthur, R. H. and J. W. MacArthur. 1961. On bird species diversity. Ecology 42:594-598.
796 Karr, J. R. 1968. Habitat and avian diversity on strip-mined land in east-central Illinois. Condor 70:348-357.
797 Mills, G. S., J. B. Dunning, Jr., and J. M. Bates. 1991. The relationship between breeding bird density and vegetation volume. Wilson Bulletin 103:468-479.
798 Richer, C. (ed.) 1996. *San Francisco Peninsula Birdwatching*. Sequoia Audubon Society.

an opportunity for planting of vegetation that would provide cover and other resources for use by mammals. The Project would include an 82-acre[799] Grassland Ecology Park that would, at a minimum, contain 43 acres of native-dominated grassland habitat. This grassland would be managed specifically for grassland-associated species, providing enhanced native habitat and foraging opportunities for several mammal species. These new and improved Project components (as implemented through mitigation measure MM BI-7b) would provide new and/or enhanced habitat conditions for small and medium-sized mammals, which would be a beneficial impact.

Fish, Shellfish, and Mollusks

Although no formal fish surveys have been performed, many areas of open water support an array of common estuarine/marine species from encrusting tunicates, sponges, and algae to bottom-dwelling fish (halibut, flounder, and sole), to more open water fish like anchovies, herring, and sardines. Under the worst-case scenario, the Project would affect approximately 29 acres of aquatic habitat, which would have the potential to affect these common species both directly through mortality of individuals or loss of habitat and indirectly through mechanisms such as increased competition, decreased water quality or other common impacts associated with in-water construction. However, the San Francisco Bay is approximately 400 square miles in area, and many of the common species that would be affected by the Project would have ample areas to relocate to. Those individuals that would experience direct mortality represent a very small proportion of the regional populations of these common species. Consequently, the Project's impacts would have a negligible effect on regional populations of common fish and aquatic invertebrates (however, refer to Impact BI-12a and Impact BI-12b below regarding impacts to EFH).

Impact BI-3: Sensitive Plants

Impact of Candlestick Point

Impact BI-3a **Construction at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on any plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (No impact) *[Criteria N.a and N.b]***

Candlestick Point is largely developed. Those areas not developed are highly modified and support only ruderal (disturbed) habitats and ornamental landscaping. Most vegetation in the area has been introduced as landscape plants and turf grass or consists of weedy, non-native species that readily colonize recently disturbed areas. Special-status plants were not observed during any of the focused botanical surveys in 2007 or 2008.[800] Disturbances include: a lack of natural fire regimes (largely since Euro-American settlement); construction of Candlestick Park stadium and associated roads and parking areas; development of CPSRA; increasing competition from invasive non-native species; and on-going disturbances such as vegetation management, trash, and pedestrian traffic. These disturbances have resulted in urbanization of almost all of Candlestick Point. The remaining vegetated areas have been reduced in quality. Because no

[799] This acreage reflects the area of parklands that would be suitable for on-site species and represent only a portion of the total new park lands that would be created by the Project.
[800] Caltrans, Natural Environmental Study Report for the Bayview Transportation Improvements Project, Jones and Stokes, July 2007.

special-status plants have been observed and the site generally does not support the preferred or required soils (i.e., serpentine) needed to support special-status plant species, sensitive plant species are considered absent from Candlestick Point. No impact would occur, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-3b **Construction at HPS Phase II and construction of the Yosemite Slough bridge would not have a substantial adverse effect, either directly or through habitat modifications, on any plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (No impact) *[Criteria N.a and N.b]***

HPS Phase II is dominated by industrial and developed areas. The southern shoreline of HPS Phase II and the bridge footprint area is a mixture of salt marsh, seasonal brackish marsh, freshwater seasonal wetland, and non-native annual grassland. Special-status plants were not observed during any of the focused botanical or rare plant surveys in 2007 or 2008.[801] Factors limiting rare plant occurrences within this area include: a lack of natural fire regimes (largely since Euro-American settlement); early maritime development; and construction of a World War II-era Shipyard, as well as post-war development. Those actions have resulted in urbanization of almost all of HPS Phase II. Because no special-status plants have been observed and the site generally does not support the preferred or required soils (i.e., serpentine) needed to support special-status plant species, sensitive plant species are considered absent from HPS Phase II and Yosemite Slough bridge areas. Therefore, no impact would occur, and no mitigation is required.

Impact BI-4: Sensitive Vegetation Communities: Waters of the United States and Navigable Waters

Impact of Candlestick Point

Impact BI-4a **Construction at Candlestick Point would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation) *[Criterion N.c]***

As detailed in Table III.N-4 (Impacts to Wetlands and Other Jurisdictional Waters of the United States [Section 404]) and depicted in Figure III.N-5 (Impacts to Wetlands and Other Waters), through site grading, materials laydown, facilities construction, vegetation removal, and installation of shoreline treatments, Project activities at Candlestick Point would permanently impact 0.29 acre of tidal salt marsh and 4.34 acres of Section 404 "other waters", relative to existing conditions (i.e., prior to completion of remediation efforts by the Navy). Both wetlands and mud flats, the latter comprising a subset of Section 404 "other waters," are considered Special Aquatic Sites under *Clean Water Act* Section 404. It would also temporarily impact 0.01 acre of tidal salt marsh and 0.64 acre of Section 404 "other waters", relative to existing conditions. Permanent impacts are those that would remove wetlands or jurisdictional waters and not replace those habitats in the same location. Temporary impacts are short term because, after construction, any areas disturbed would be restored to the previous condition.

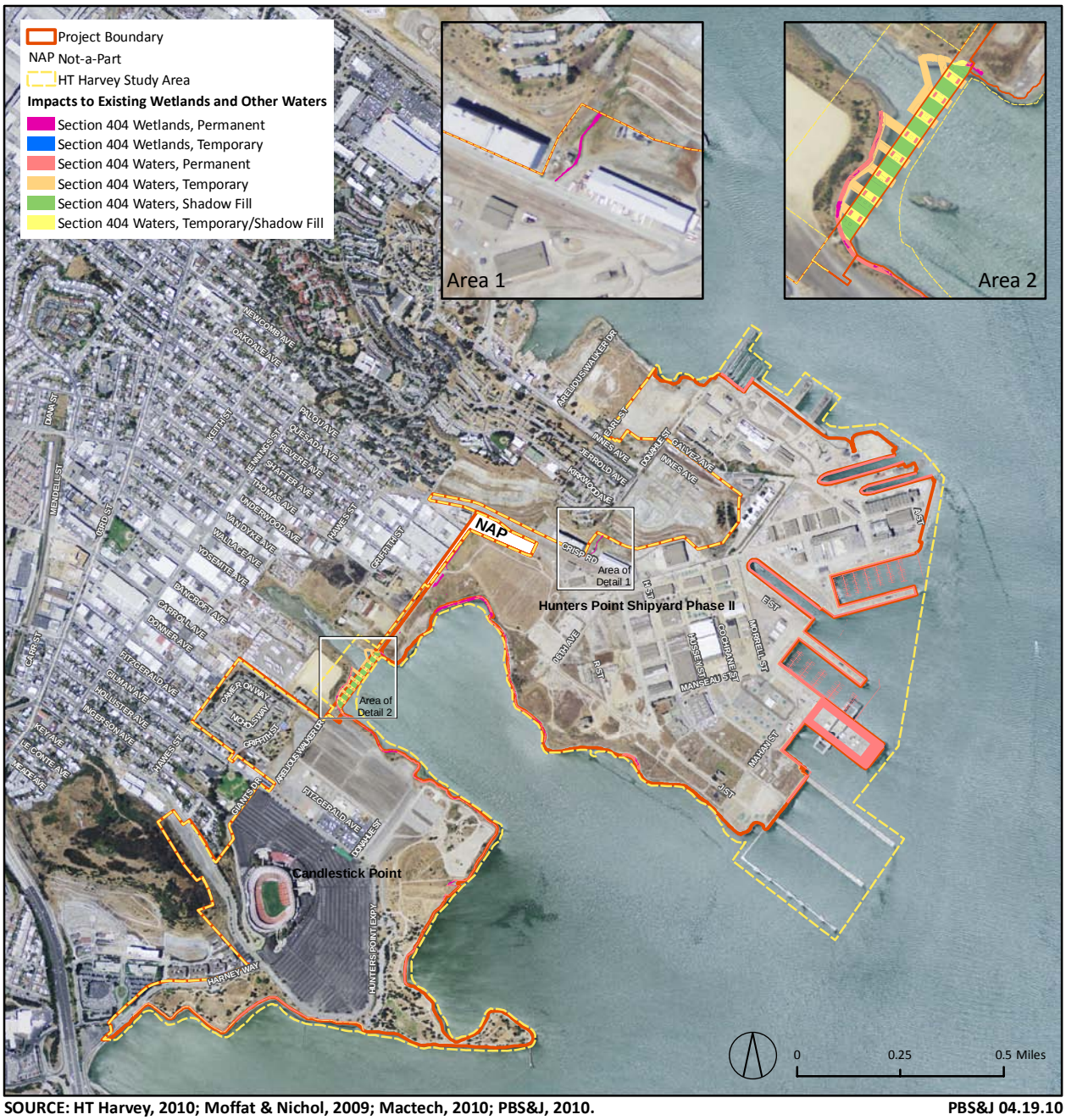
[801] Jones and Stokes, Natural Environmental Study Report for the Bayview Transportation Improvements Project, June 2009.

Table III.N-4 Impacts to Wetlands and Other Jurisdictional Waters of the United States (Section 404)

Jurisdictional Feature (Waters of the United States)	*Area*				*Yosemite Slough*						
	Candlestick Point		*HPS Phase II*		*On Site*		*Off Site*				
	Temporary Impacts	*Permanent Impacts*	*Temporary Impacts*	*Permanent Impacts*	*Temporary Impacts*	*Permanent Impacts*	*Temporary Impacts*	*Permanent Impacts*	*Temporary Totals*	*Permanent Totals*	*Grand Totals*[a]
Freshwater Wetland	—	—	—	0.17	—	—	—	—	—	0.17	0.17
Non-tidal Salt Marsh	—	—	—	0.15	—	—	—	—	—	0.15	0.15
Tidal Salt Marsh	0.01	0.29	—	0.09	—	0.01	<0.01 (40 sf)	0.03	0.01	0.42	0.43
"Other Waters"	0.64	4.34	0.85	20.26	0.53	0.18	0.75	0.19	2.76	24.97	27.73
Totals for Impacted Section 404 Jurisdictional Features	***0.65***	***4.63***	***0.85***	***20.67***	***0.53***	***0.19***	***0.75***	***0.22***	***2.77***	***25.71***	***28.48***

SOURCES: H.T. Harvey & Associates, *Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters, San Francisco, California*, February 2009 and revised July 13 and October 13, 2009.
MACTEC. *Work Program for the Construction of the Yosemite Slough Bridge Corridor*, March 2010.

a. Totals may not add up due to rounding.



SOURCE: HT Harvey, 2010; Moffat & Nichol, 2009; Mactech, 2010; PBS&J, 2010. PBS&J 04.19.10

FIGURE III.N-5 ~~Candlestick Point - Hunters Point Shipyard Phase II EIR~>
IMPACTS TO WETLANDS AND OTHER WATERS

Shoreline improvements at Candlestick Point would result in the removal of approximately 2.86 acres of fill, and the placement of approximately 3.46 acres of fill. A net decrease of approximately 0.42 acre of open waters would occur at Candlestick Point. These impacts would occur entirely along the Candlestick Point shoreline as a result of construction of revetments to minimize flooding and shoreline erosion, and as a result of the placement of soils or sand to enhance beach or marsh habitat. For example, along most of the northern and southern edges of Candlestick Point, marsh soils would be placed in jurisdictional areas following completion of the revetment to provide a gentler slope than is currently present, which would allow for colonization by marsh vegetation. As a result, much of the fill of jurisdictional areas (as reflected in Table III.N-4 and Figure III.N-5) would result in an enhancement of habitat and, thus, would be self-mitigating.

In addition to the direct removal of wetlands and other waters, construction in or adjacent to the Bay in the wetlands could also result in indirect impacts such as increased erosion and sedimentation into and hydrologic disruption of wetlands and jurisdictional waters, decreased water quality from construction runoff and potential construction contaminants including oil, grease and fuel, and temporary decrease in habitat functions and values through hydrological disruption or elevated disturbance. However, construction of shoreline revetments would reduce erosion and turbidity in the long term by addressing existing problems with shoreline erosion.

Direct removal, placement of fill into, or hydrological interruption of federally or state-protected wetlands and other waters that would result in a net loss of these areas would be considered a significant impact. However, any alterations of, or discharges into, jurisdictional waters and wetlands must be in conformance with the CWA (via Sections 404 and 401 certification) and Section 10 of the *Rivers and Harbor's Act*, as applicable. These regulations are designed to ensure, among other things, that there is no net loss of wetlands and that water quality is maintained. Additionally, runoff produced during and after construction is subject to National Pollution Discharge Elimination System (NPDES) Regulations and local water quality and runoff standards.

To reduce impacts to wetlands and jurisdictional waters, the following mitigation measures shall be implemented:

MM BI-4a.1 *Wetlands and Jurisdictional/Regulated Waters Mitigation for Temporary and/or Permanent Impacts. Wetlands and jurisdictional waters shall be avoided to the maximum extent practicable for all Project components. For example, any measures taken to improve the existing shoreline of Candlestick Point or HPS Phase II for purposes of flood control, erosion control, or repair or stabilization of existing structures shall minimize the amount of fill to be placed in jurisdictional areas.*

Where avoidance of existing wetlands and drainages is not feasible, and before any construction activities are initiated in jurisdictional areas, the Applicant shall obtain the following permits, as applicable to the activities in question:

- *CWA Section 404 permit from the USACE.*
- *Section 10* Rivers and Harbors Act *Permit from the USACE.*
- *CWA Section 401 water quality certification from the RWQCB, and/or Report of Waste Discharge for Waters of the State.*
- *CWA Section 402/National Pollution Discharge Elimination System permit from SWRCB [requiring preparation of a Stormwater Pollution Prevention Plan (SWPPP)].*

- *CDFG Section 1602 streambed alteration agreement from CDFG.*
- *A permit from the BCDC.*
- *Dredging permits from the USACE and BCDC as required, obtained through the Dredged Material Management Office (DMMO) process.*

Copies of these permits shall be provided to the contractor, along with the construction specifications. The Project Applicant shall be responsible for complying with all of the conditions set forth in these permits, including any financial responsibilities.

Compensation for impacts to wetlands and jurisdictional waters shall be required to mitigate any permanent impacts to these habitats to less-than significant-levels. Such mitigation shall also be developed (separately from the CEQA process) as a part of the permitting process with the USACE, or for non-USACE-jurisdictional wetlands, during permitting through the SFRWQCB, BCDC, and/or CDFG. The exact mitigation ratio shall be established during the permitting process, and depends on a number of factors, including the type and value of the wetlands permanently affected by the Project; however, mitigation shall be provided at a ratio of no less than 1:1 (at least 1 acre of mitigation for every 1 acre of waters of the US/State permanently filled). Mitigation could be achieved through a combination of on-site restoration or creation of wetlands or aquatic habitats (including removal of on-site fill or structures such as piers, resulting in a gain of wetland or aquatic habitats); off-site restoration/creation; and/or mitigation credits purchased at mitigation banks within the San Francisco Bay Region. However, any mitigation for impacts to jurisdictional waters providing habitat for special-status fish such as the green sturgeon, Central California Coast steelhead, Chinook salmon, and longfin smelt must result in the restoration or creation (at a minimum 1:1 ratio) of suitable habitat for these species, and any mitigation for impacts to jurisdictional wetlands or other waters that are considered EFH by the NMFS must result in the restoration or creation (at a minimum 1:1 ratio) of EFH. Suitably planned mitigation sites may satisfy mitigation requirements for jurisdictional areas, special-status fish, and EFH simultaneously (i.e., in the same mitigation areas) if the mitigation satisfies all these needs.

For funding of off-site improvements or purchase of mitigation bank credits, the Project Applicant shall provide written evidence to the City/Agency that either (a) compensation has been established through the purchase of a sufficient number of mitigation credits to satisfy the mitigation acreage requirements of the Project activity, or (b) funds sufficient for the restoration of the mitigation acreage requirements of the Project activity have been paid to the BCDC, CCC, or other entity or agency that offers mitigation credits in the San Francisco Bay Area.

For areas to be restored, to mitigate for temporary or permanent impacts, the Project Applicant shall prepare and implement a Wetland and Jurisdictional Waters Mitigation Monitoring Plan (Mitigation Monitoring Plan). The Plan shall be submitted to the regulatory agencies along with permit application materials for approval, along with a copy to the City/Agency.

The Project Applicant shall retain a restoration ecologist or wetland biologist to develop the Wetland and Jurisdictional Waters Mitigation and Monitoring Plan, and it shall contain the following components (or as otherwise modified by regulatory agency permitting conditions):

1. *Summary of habitat impacts and proposed mitigation ratios, along with a description of any other mitigation strategies used to achieve the overall mitigation ratios, such as funding of off-site improvements and/or purchase of mitigation bank credits*
2. *Goal of the restoration to achieve no net loss of habitat functions and values*
3. *Location of mitigation site(s) and description of existing site conditions*

4. *Mitigation design:*
   - *Existing and proposed site hydrology*
   - *Grading plan if appropriate, including bank stabilization or other site stabilization features*
   - *Soil amendments and other site preparation elements as appropriate*
   - *Planting plan*
   - *Irrigation and maintenance plan*
   - *Remedial measures/adaptive management, etc.*
5. *Monitoring plan (including final and performance criteria, monitoring methods, data analysis, reporting requirements, monitoring schedule, etc.)*
6. *Contingency plan for mitigation elements that do not meet performance or final success criteria.*

Restoration and/or creation of wetlands or aquatic habitats could occur on site or off site and at one or more locations, as approved by the regulatory agencies. Impacts occurring due to activities on Candlestick Point may be mitigated by restoration or creation activities on HPS Phase II and vice versa. For example, loss of open water habitat that might result from construction of shoreline treatments could potentially be mitigated by the removal of fill or structures from aquatic habitat on HPS Phase II.

The Project Applicant, or its agent, shall implement the Wetland and Jurisdictional Waters Mitigation Monitoring Plan. At least five years of monitoring (or more if required as a condition of the permits) shall be conducted to document whether the success criteria (that are determined as part of the mitigation plan) are achieved, and to identify any remedial actions that must be taken if the identified success criteria are not met. Annual monitoring reports (described below) shall be submitted to CDFG, the USACE, the BCDC, the City/Agency, and the SFRWQCB. Each report shall summarize data collected during the monitoring period, describe how the habitats are progressing in terms of the success criteria, and discuss any remedial actions performed. Additional reporting requirements imposed by permit conditions shall be incorporated into the Wetland and Jurisdictional Waters Mitigation Monitoring Plan and implemented.

Success criteria for specified years of monitoring for vegetated mitigation wetlands are as follows (though these may be subject to change pending development of specific Mitigation and Monitoring Plans and consultation during the permit process):

- *Year 1 after restored areas reach elevations suitable for colonization by wetland plants: 10 percent combined area and basal cover (rhizomatous turf) of all vegetation in the preserve wetland; at least two hydrophytic plants co-dominant with whatever other vegetative cover exists.*
- *Year 3 after restored areas reach colonization elevation: 50 percent combined area and basal cover (rhizomatous turf) of all vegetation; prevalence of hydrophytic species in terms of both cover and dominant species composition of the vegetation; native vascular species shall comprise 95 percent of the vegetation in the preserve wetland.*
- *Year 5 after restored areas reach colonization elevation: 70 percent combined area and basal cover (rhizomatous turf) of all vegetation; more than 50 percent dominance in terms of both cover and species composition of facultative (FAC), facultative wetland (FACW), and obligate (OBL) species; native vascular species shall comprise 95 percent of the vegetation in the preserve wetlands.*

Other success criteria shall be developed for open water/mud flat habitats (which would not be expected to support vegetation) or for wetland complexes specifically designed to contain extensive areas of channels, pannes, or flats that would not be vegetated. In addition, the final Project design shall avoid substantial

adverse effects to the pre-Project hydrology, water quality, or water quantity in any wetland that is to be retained on site. This shall be accomplished by avoiding or repairing any disturbance to the hydrologic conditions supporting these wetlands, as verified through an on-site Wetland Protection Plan that shall be prepared by a restoration ecologist or wetland biologist that is retained by the Project Applicant, and submitted to regulatory agencies for approval, along with a copy to the City/Agency. If such indirect effects cannot be avoided, compensatory mitigation shall be provided for the indirectly affected wetlands at a minimum 1:1 ratio, as described above. Mitigation for indirectly impacted wetlands shall be described in the Wetland and Jurisdictional Waters Mitigation and Monitoring Plan.

Project features resulting in impacts to open water areas as a result of the marina, bridge, and breakwater construction shall be designed to be the minimum size required to meet their designated need. The opening in the breakwater shall be large enough and positioned such that it would allow for a complete daily exchange of water within the marina that would otherwise result from normal tidal flow, as determined by a coastal engineer and an aquatic biologist. This opening shall be designed to minimize disruption to the local hydrology generated by the breakwater and allow for normal tidal flow to ensure the daily exchange of nutrients.

MM BI-4a.2 *Wetlands and Jurisdictional/Regulated Waters Impact Minimization for Construction-Related Impacts. The Project Applicant shall ensure that the contractor minimizes indirect construction-related impacts on wetlands and jurisdictional/regulated waters throughout the Study Area by implementing the following Best Management Practices (BMPs):*

- *Prior to any construction activities on the site, a protective fence shall be installed a minimum of one foot (or greater, if feasible) from the edge of all wetland habitat to be avoided in the immediate vicinity of the proposed construction areas. Prior to initiation of construction activities, a qualified biologist shall inspect the protective fencing to ensure that all wetland features have been appropriately protected. No encroachment into fenced areas shall be permitted during construction and the fence shall remain in place until all construction activities within 50 feet of the protected feature have been completed.*
- *Construction inspectors shall routinely inspect protected areas to ensure that protective measures remain in place and effective until all construction activities near the protected resource have been completed. The fencing shall be removed immediately following construction activities.*
- *To maintain hydrologic connections, the Project design shall include culverts for all seasonal and perennial drainages that are waters of the United States and/or Waters of the State.*
- *Sediment mitigation measures shall be in place prior to the onset of Project construction and shall be monitored and maintained until construction activities have been completed. Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be disposed of at a regional landfill or at another approved and/or properly permitted location. Stockpiles that are to remain on the site throughout the wet season shall be protected to prevent erosion.*
- *Where determined necessary by regulatory agencies, geotextile cushions and other appropriate materials (i.e., timber pads, prefabricated equipment pads, geotextile fabric) shall be used in saturated conditions to minimize damage to the substrate and vegetation.*
- *Exposed slopes and banks shall be stabilized immediately following completion of construction activities to reduce the effects of erosion on the drainage system.*
- *In highly erodible areas, such as Yosemite Slough, banks shall be stabilized using a non-vegetative material that shall bind the soil initially and break down within a few years. If, during review of*

the grading permit for this area, the City/Agency determines that more aggressive erosion control treatments are needed, the contractor shall be directed to use geotextile mats, excelsior blankets, or other soil stabilization products.

- *The contractors shall develop a Storm Water Pollution Prevention Plan (SWPPP) prior to construction. As discussed in the Regulatory Framework of the Hydrology and Water Quality section of this EIR, the SWPPP will comply with applicable local, state, and federal requirements. Erosion control BMPs may include, but are not limited to, the application of straw mulch; seeding with fast growing grasses; construction of berms, silt fences, hay bale dikes, stormwater detention basins, and other energy dissipaters. BMPs shall be selected and implemented to ensure that contaminants are prevented from entering the San Francisco Bay during construction and operation of the facilities shall protect water quality and the marine species in accordance with all regulatory standards and requirements.*
- *Testing and disposal of any dredged sediment shall be conducted as required by the USACE and the Long-Term Management Strategy (LTMS)*[802]
- *All temporarily impacted wetlands and other jurisdictional waters, whether in tidal or non-tidal areas, shall be restored to pre-construction contours following construction. Such impact areas include areas that are dewatered (e.g., using coffer dams) and/or used for construction access. Temporarily impacted wetlands that were vegetated prior to construction shall be revegetated in accordance with a Wetlands and Jurisdictional Water Mitigation and Monitoring Plan as described above.*
- *For impacts to tidal habitats:*
  - *Conduct all work in dewatered work areas*
  - *Install sediment curtains around the worksite to minimize sediment transport*
  - *Work only during periods of slack, tide (minimal current) and low wind to minimize transport of sediment laden water*

Implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2 would reduce the effects of construction-related activities to wetlands by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation and/or restoration), obtaining permits from the USACE, SFRWQCB, BCDC, and other agencies as applicable that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. Consequently, implementation of these mitigation measures would reduce potential adverse effects to wetlands and jurisdictional waters to less-than-significant levels.

[802] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001.

Impact of Hunters Point Shipyard Phase II

Impact BI-4b **Construction at HPS Phase II would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation) *[Criterion N.c]***

As detailed in Table III.N-4 and depicted in Figure III.N-5, through site grading, materials laydown, facilities construction, vegetation removal, installation of shoreline treatments, and construction of the marina, Project activities at HPS Phase II would permanently impact existing wetlands and other waters as follows: 0.17 acre of nontidal freshwater wetland, 0.09 acre of tidal salt marsh, 0.15 acre of non-tidal salt marsh, and 20.26 acres of Section 404 other waters. It would also temporarily impact 0.85 acre of Section 404 other waters. Permanent impacts are those that would remove wetlands or jurisdictional waters and not replace them in the same location. Temporary impacts are short term because, after construction, any areas disturbed would be restored to the previous condition.

For the purpose of discussing all project activities that could affect aquatic habitats, impacts to open waters that will result from the removal of existing structures (such as pier headwalls) are considered permanent impacts, since there will be some fill placed within the new open water/intertidal habitat for slope stabilization or restoration purposes after the existing structures are removed. However, such an approach to impact estimation is very conservative, as these activities will result in ecological enhancements by creating new aquatic habitat where none currently exists. As discussed in greater detail below, nearly 10 acres of the total 21.52 acres of impacts to jurisdictional areas on HPS Phase II would result from activities that would enhance ecological conditions along the HPS shoreline.

As mentioned for Candlestick Point above, the impact to tidal salt marsh, Section 404 other waters along the southern shoreline of HPS would occur primarily as a result of the placement of soils along the shoreline to enhance marsh habitat. Following the completion of a revetment by the Navy, the Project Applicant would enhance the revetment as needed (e.g., for aesthetics or to allow it to be more easily raised in the event of sea level rise). However, work to enhance the revetment simply for improved flood control or aesthetics is not expected to result in additional impacts to jurisdictional areas. Rather, the CP/HPS Project would add soil or other materials on the outboard side of the revetment to facilitate the creation of tidal salt marsh in several areas along the southern shoreline of HPS by reducing the revetment's slope and providing a more suitable substrate for colonization by wetland vegetation. As a result, most of the fill of jurisdictional areas (as reflected in Table III.N-4 and Figure III.N-5) along the southern shoreline of HPS (about 1.9 acres of the total acreage impacted at HPS) would result in an enhancement of habitat and, thus, would be self-mitigating.

It is possible that the Yosemite Slough Bridge and its approaches may be constructed before the Navy has completed remediation efforts (including mitigation for its impacts to wetlands) on Parcel E-2. In that case, construction of the bridge and its approaches would impact whatever wetlands have not yet been disturbed, or created, by the Navy, which may include some of the wetlands in the southwestern portion of Parcel E-2 that are included in Table III.N-4 and shown in Figure III.N-5. However, the majority of the non-tidal salt marsh in the southwestern portion of Parcel E-2 would not be impacted by the CP/HPS Project, whether the Navy has completed its remediation efforts or not. If the Navy completes its remediation and construction of its mitigation wetlands before the bridge and its approaches are constructed, then virtually all

of the currently existing wetlands on Parcels E and E-2 (including the approximately 1.8 acres of nontidal wetlands not affected by the Project) would have been impacted by the Navy's work prior to CP/HPS Project construction. A wetland mitigation site, consisting of a tidal and non-tidal component, has been proposed by the Navy on the southwestern corner of Parcel E-2 (refer to Figure III.N-6 [Proposed HPS Phase II Wetlands]). Portions of this proposed mitigation site cannot be avoided during construction of the bridge and its approaches. Thus, if the Navy's mitigation were constructed in the proposed locations, the bridge and roadway right-of-way would permanently impact approximately 0.0992 acre and temporarily impact 0.1532 acre of wetlands on this mitigation site. The remainder of the mitigation site would not be impacted by the CP/HPS Project, but rather would be preserved and incorporated into the Project area.

Of the 21.52 acres of total impacts to jurisdictional wetlands and other waters of the US that would occur on HPS Phase II, jurisdictional areas that would be completely lost (i.e., converted to non-jurisdictional habitats) total only 2.56 acres. This loss of habitat would occur due to construction of the northern abutment of the Yosemite Slough bridge, along the approach road to the bridge, where a freshwater wetland is located in the west-central part of the site, and where construction of new breakwaters, a floating dock, and a gangway would be placed in the marina. Of the remaining impacts, approximately 8.96 acres would result from fill placed for drydock repairs, buttressing required to support existing pier walls and bulkheads, or other shoreline improvements.

The Project also includes the removal of some shoreline structures (i.e., piers and/or bulkheads) and placement or replacement of fill material that are currently present in jurisdictional areas. For example, portions of the Re-gunning pier and edges of bulkheads along much of the eastern part of HPS Phase II would be removed to create new open-water habitat. Although these areas are considered permanently impacted for the purposes of this impact assessment, since some fill would be placed along the new shoreline of these bulkheads for stabilization purposes, removal of structures and fill would restore approximately 8 acres of aquatic habitat. Considering that marsh restoration along the southern edge of HPS is responsible for approximately 1.9 acres of impacts, nearly 10 acres of the total 21.52 acres of impacts to jurisdictional areas on HPS Phase II would result from activities that would enhance ecological conditions along the HPS shoreline.

Direct removal, placement of fill into, or hydrological interruption of federally or state-protected wetlands that would result in a net loss of these areas would be considered a substantial adverse effect. In addition, removal of an established mitigation site would also be considered a substantial adverse effect. However, prior to any grading or construction that may impact jurisdictional area(s), any alterations of, or discharges into, jurisdictional waters and wetlands must be in conformance with the CWA (via Sections 404 and 401 certification) and Section 10 of the *Rivers and Harbors Act*, as applicable. These regulations are designed to ensure, among other things, that there is no net loss of wetlands and that water quality is maintained. Additionally, runoff produced during and after construction is subject to NPDES and local water quality and runoff standards. Lastly, mitigation measures MM BI-4a.1 and MM BI-4a.2 (first discussed in Impact BI-4a) would be implemented to reduce the effects of construction-related activities to wetlands by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation and/or restoration), obtaining permits from the USACE, SFRWQCB, BCDC, and other agencies as applicable that are designed to protect wetlands and jurisdictional

SOURCE: Yosemite Slough Road Plan, Profile and Sections, Winzler & Kelly, September 2008, MACTEC, 2009. **PBS&J 10.27.2009**

FIGURE III N-6 Candlestick Point - Hunters Point Shipyard Phase II EIR

PROPOSED HPS PHASE II WETLANDS

waters, and implementing construction BMPs to reduce and/or prevent impacts to on waters of the United States, including wetlands and navigable waters. Consequently, implementation of these mitigation measures would reduce potential adverse effects to less-than-significant levels.

Impact of Yosemite Slough Bridge

Impact BI-4c **Construction of the Yosemite Slough bridge would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation) *[Criterion N.c]***

The new Yosemite Slough bridge would be a nine-span steel-beam bridge as shown on the MACTEC Engineering and Consulting preliminary draft drawings titled "Yosemite Slough Bridge" (Appendix N2).[803] These plans indicate that the bridge would be approximately 81 feet wide and 902 feet long, and would be supported by 20 steel-pile supported columns and 12 bedrock-supported columns.

As detailed in Table III.N-4 and depicted in Figure III.N-5, bridge construction equipment and materials would be staged at the site in designated lay down areas. Construction access and dewatering would result in temporary impacts to 0.52 acre of Section 404 other waters. It would also result in permanent impacts to 0.01 acre of tidal salt marsh, and 0.18 acre of Section 404 other waters.[804] Construction of the piers' pilings would require the excavation of approximately 2,400 cubic yards of material from the slough; 167 cubic yards of material would be excavated from jurisdictional areas for construction of abutments and installation of riprap at the toe of the north and south bridge abutments.[805]

Temporary off-site impacts (i.e., in portions of Yosemite Slough outside the Project boundary) from construction include less than 0.01 acre of tidal salt marsh, and 0.75 acre of Section 404 other waters. Permanent off-site impacts from construction include 0.03 acre of tidal salt marsh and 0.19 acre of Section 404 other waters. In addition to solid material placed within the Bay, the BCDC considers structures suspended above the Bay or floating on the water to be "fill" and subject to their regulation. The "shadow fill" produced by the Yosemite Slough bridge may change the biological functions and values of aquatic and mud flat habitats below to some extent; such an impact would cover approximately 1.48 acres based on the acreage of mudflat below the immediate bridge surface. Shadow fill would not result in the complete loss of functions and values of the aquatic habitats below, however, and many fish and aquatic organisms would continue to use these areas following bridge construction.

Direct removal, placement of fill into, or hydrological interruption of federally or state-protected wetlands that would result in a net loss of these areas would be considered a significant impact. However, any alterations of, or discharges into, jurisdictional waters and wetlands must be in conformance with the CWA (via Sections 404 and 401 certification) and Section 10 of the *Rivers and Harbors Act*, as applicable. These regulations are designed to ensure, among other things, that there is no net loss of wetlands and that water

803 MACTEC. Preliminary Draft: Yosemite Slough Bridge, Sheets 1-7, October 2009, which is provided as Appendix N2 to this EIR.
804 Ibid.
805 Ibid.

quality is maintained. Additionally, runoff produced during and after construction is subject to NPDES and local water quality and runoff standard.

Mitigation measure MM BI-4a.1 shall be implemented to compensate for the loss of wetlands and other jurisdictional waters resulting from the Yosemite Slough bridge. For example, permanent fill of such habitats would be compensated by creation or restoration of jurisdictional habitats on or off site, and/or by the purchase of credits in a mitigation bank; such compensation would be performed in conjunction with compensation for impacts to jurisdictional areas on Candlestick Point and HPS. Any vegetated wetlands that are permanently impacted by shading from the bridge would be mitigated in this manner since shading may inhibit vegetation colonization under the bridge after construction is complete. However, shading of 1.48 acres of mud flats and aquatic habitats would have only moderate effects on the functions and values of these habitats and would not result in the loss of these habitats. Mitigation measure MM BI-4a.2 shall be implemented to minimize indirect construction-related impacts on wetlands and other jurisdictional waters. Further, shading impacts to mud flats and aquatic habitats would be reduced by implementation of mitigation measure MM BI-4c.

MM BI-4c *Mitigation for Shading Impacts to Jurisdictional/Regulated Waters. Mud flats and aquatic habitats impacted by permanent shading from the Yosemite Slough bridge shall be mitigated by the creation or restoration, either on site, off site, and/or via purchase of mitigation bank credits, at a 0.5:1 (mitigation:impacted) ratio. Aside from the mitigation ratio, such mitigation shall be provided as described for mitigation measure MM BI-4a.1.*

Mitigation measures MM BI-4a.1 and MM BI-4a.2 (first discussed in Impact BI-4a) would be implemented to reduce the effects of construction-related activities to wetlands by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation and/or restoration), obtaining permits from the USACE, SFRWQCB, BCDC, and other agencies as applicable that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. In addition, implementation of mitigation measure MM BI-4c would mitigate the impacts of shadow fill to mud flats and aquatic habitats as a result of construction of Yosemite Slough bridge. Consequently, implementation of mitigation measures MM BI-4a.1, MM BI-4a.2, and MM BI-4c would fully mitigate for the temporary and permanent loss of wetlands and jurisdictional waters, and adverse effects would be less than significant.

Impact BI-5: Sensitive Vegetation Communities: Eelgrass Beds

Impact of Candlestick Point

Impact BI-5a **Construction at Candlestick Point would not have a substantial adverse effect on eelgrass beds, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. (No Impact) *[Criterion N.b]***

Development at Candlestick Point would require minor in-water work associated with construction of the shoreline treatments. The distribution of eelgrass has been mapped recently and the results of this effort

indicate that no eelgrass beds are found in the near-shore waters of the Candlestick Point peninsula.[806] Therefore, construction activities at Candlestick Point would have no impact on this sensitive resource. No mitigation is required.

Impact of Hunters Point Shipyard Phase II and Yosemite Slough Bridge

Impact BI-5b **Construction at HPS Phase II and construction of the Yosemite Slough bridge would not have a substantial adverse effect on eelgrass beds, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. (Less than Significant with Mitigation) *[Criterion N.b]***

Within HPS Phase II a total of 1.99 acres of eelgrass has been mapped at two locations (refer to Figure III.N-2). A small eelgrass occurrence was reported along the north shore of the South Basin directly across from Candlestick Point.[807] The only other reported occurrence of eelgrass within HPS Phase II is on the north shore, east of the northern end of Earl Street.[808] This eelgrass bed extends from the end of Earl Street to the pier that forms Drydock 5. These eelgrass beds are mapped as being below mean sea level and, therefore, are spatially separated from areas where shoreline treatments would occur. There are no mapped eelgrass beds where the marina improvements would occur or where the Yosemite Slough bridge would be constructed. However, because the locations of eelgrass occurrence may vary over time, eelgrass not detected during previous surveys could potentially occur in the shallow waters in or near the Yosemite Slough bridge construction footprint, either now or in the future.

The shoreline improvements associated with HPS Phase II include transforming the revetment edge in wave-protected reaches to a more natural looking shoreline by placing suitable fill to cover the revetment that would be constructed by the Navy, which may include Articulated Concrete Block (ACB) mats and/or marsh soils. Shoreline wave berms may be included along the southwest facing shoreline at the bayward end of the ACB mats. If wave berms or other shoreline improvements, or the Yosemite Slough bridge, were constructed in areas where eelgrass beds exist, they could directly impact them through excavation/removal or placement of fill material. Construction of these features or other shoreline treatments near eelgrass beds could also result in the mobilization of some sediment, which, if it were to settle out on eelgrass, could reduce photosynthesis and, therefore, productivity and survival. Because of the ecological importance but regional scarcity of eelgrass beds and the potential contribution of eelgrass beds in the Study Area to populations of aquatic species (and their predators) throughout larger portions of the Bay, any impacts would be considered a substantial reduction in the local population and, therefore, a substantial adverse effect.

To reduce this impact, the following mitigation measures shall be implemented.

MM BI-5b.1 *Avoidance of Impacts to Eelgrass. As the design of shoreline treatments progresses, and a specific Shoreline Treatment Plan is determined, the Plan shall minimize any in-water construction required for installation of any treatment measures near either of the two eelgrass locations noted above.*

[806] San Francisco Bay Eelgrass Inventory, June-October 2003. Prepared for Caltrans and NOAA Fisheries. Prepared by Merkel and Associates, 2003.
[807] Ibid.
[808] Ibid.

MM BI-5b.2 *Eelgrass Survey. Prior to the initiation of construction of the Yosemite Slough bridge or construction of shoreline treatments, an update to the existing eelgrass mapping shall be conducted to determine the precise locations of the eelgrass beds. For the shoreline treatments, this survey shall occur when a final Shoreline Treatment Plan has been prepared. The survey shall be conducted by a biologist(s) familiar with eelgrass identification and ecology and approved by NMFS to conduct such a survey. The area to be surveyed shall encompass the mapped eelgrass beds, plus a buffer of 750 feet around any in-water construction areas on Hunters Point or associated with the Yosemite Slough bridge. Survey methods shall employ either SCUBA or sufficient grab samples to ensure that the bottom was adequately inventoried. The survey shall occur between August and October and collect data on eelgrass distribution, density, and depth of occurrence for the survey areas. The edges of the eelgrass beds shall be mapped. At the conclusion of the survey a report shall be prepared documenting the survey methods, results, and eelgrass distribution within the survey area. This report shall be submitted to NMFS for approval. The survey data shall feed back into the shoreline treatment design process so that Project engineers can redesign the treatments to avoid or minimize any direct impacts to eelgrass beds.*

If the shoreline treatments can be adjusted so that no direct impacts to eelgrass beds would occur, no further mitigation under this measure would be required for shoreline treatment construction. Management of water quality concerns is addressed through mitigation measure MM BI-5b.4 and shall be required to minimize sediment accumulation on the eelgrass. If direct impacts to eelgrass beds cannot be avoided, either by Hunters Point shoreline treatments or Yosemite Slough bridge construction, mitigation measure MM BI-5b.3 shall be implemented.

MM BI-5b.3 *Compensatory Eelgrass Mitigation. If direct impacts to eelgrass beds cannot be avoided, compensatory mitigation shall be provided in conformance with the Southern California Eelgrass Mitigation Policy. Mitigation shall entail the replacement of impacted eelgrass at a 3:1 (mitigation:impact) ratio on an acreage basis, based on the eelgrass mapping described in mitigation measure MM BI-5b.2 and detailed designs of the feature(s) that would impact eelgrass beds. Such mitigation could occur either off site or on site.[809] Off-site mitigation could be achieved through distribution of a sufficient amount of funding to allow restoration or enhancement of eelgrass beds at another location in the Bay. If this option is selected, all funds shall be distributed to the appropriate state or federal agency or restoration-focused non-governmental agency (i.e., CDFG restoration fund, California Coastal Conservancy, Save the Bay, etc). The Project Applicant shall provide written evidence to the City/Agency that either a) compensation has been established through the purchase of a sufficient number of mitigation credits to satisfy the mitigation acreage requirements of the Project activity, or b) funds sufficient for the restoration of the mitigation acreage requirements of the Project activity have been paid. These funds shall be applied only to eelgrass restoration within the Bay.*

If on-site mitigation is selected as the appropriate option, the Project Applicant shall retain a qualified biologist familiar with eelgrass ecology (as approved by the City/Agency) to prepare and implement a detailed Eelgrass Mitigation Plan. Unless otherwise directed by NMFS, the Eelgrass Mitigation Plan shall follow the basic outline and contain all the components required of the Southern California Eelgrass Mitigation Policy (as revised in 2005),[810] including: identification of the mitigation need, site, transplant methodology, mitigation extent (typically 3:1 on an acreage basis[811]), monitoring protocols (including

[809] NMFS, Southwest Regional Office, Southern California Eelgrass Mitigation Policy, as revised August 30, 2005. Website: http://swr.nmfs.noaa.gov/hcd/policies/EELPOLrev11_final.pdf. Accessed July 20, 2009.
[810] NMFS, Southwest Regional Office, Southern California Eelgrass Mitigation Policy, as revised August 30, 2005. Website: http://swr.nmfs.noaa.gov/hcd/policies/EELPOLrev11_final.pdf. Accessed July 20, 2009.
[811] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management

frequency, staffing, reviewing agencies, duration, etc), and success criteria. A draft Eelgrass Mitigation Plan shall be submitted to NMFS, for its review and approval prior to implementation, with a copy to the City/Agency. Once the plan has been approved, it shall be implemented in the following appropriate season for transplantation. Restored eelgrass beds shall be monitored for success over a 5-year period.

MM BI-5b.4 *Eelgrass Water Quality BMPs. To prevent sediment that could be suspended during construction from settling out onto eelgrass, for any shoreline treatments within 750 feet of identified eelgrass beds, the Project Applicant shall require the selected contractor to implement appropriate BMPs that could include any or all of the following options, or others deemed appropriate by NMFS:*

1. *Conduct all work in dewatered work areas*
2. *Conduct all in-water work during periods of eelgrass dormancy (November 1-March 31)*
3. *Install sediment curtains around the worksite to minimize sediment transport*
4. *Work only during periods of slack tide (minimal current) and low wind to minimize transport of sediment laden water*

Implementation of mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects of shoreline treatments on eelgrass by avoiding impacts through initial design if feasible; determining the locations of eelgrass beds through surveys; using survey data to refine shoreline treatments to further avoid or minimize impacts to eelgrass; and compensating for unavoidable impacts through the creation or restoration of eelgrass beds at a 3:1 ratio, thus replacing impacted habitat and increasing its abundance regionally. Consequently, implementation of these mitigation measures would reduce potential adverse effects to less-than-significant levels.

Impact BI-6: Birds

Impact of Candlestick Point

Impact BI-6a **Construction at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on any bird species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (Less than Significant with Mitigation) *[Criterion N.a]***

Special-status avian species (as defined in the Setting portion of this section) for which suitable habitat is present on site, and that have a "low" or better potential to occur, include the Alameda song sparrow, American peregrine falcon, burrowing owl, Bryant's savannah sparrow, California brown pelican, loggerhead shrike, northern harrier, San Francisco common yellowthroat, short-eared owl, tricolored blackbird, and white-tailed kite (refer to Table III.N-5). Some of these species have never nested on the Project site and are not expected to nest here due to the absence of suitable nesting habitat, human disturbance, or predation risk; such species include the California brown pelican, northern harrier, short-eared owl, and tricolored blackbird. Of the remaining species, only the American peregrine falcon has been confirmed breeding on the site; operational impacts to this species are discussed in Impact BI-16 below. For reasons described previously, there is a low probability that the Alameda song sparrow, burrowing owl, Bryant's savannah sparrow, loggerhead shrike, San Francisco common yellowthroat, and white-tailed kite

Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001; Appendix F – ESA and EFH Consultation.

currently breed here. Nevertheless, if any of these special-status species nests on the site, there is some potential that active nests, including eggs or young, could be destroyed by vegetation removal, grading, or other Project activities, or that Project activities could disturb nesting adults to the point of nest abandonment, causing the loss of eggs or young.

In addition to recognized special-status species, as discussed above in Regulatory Framework, all native bird species that may use the site are protected under the MBTA and *California Fish and Game Code*. These laws protect many common species in addition to those considered special-status species.

It is unlikely that construction activities would result in the loss of free-flying birds (though see Impact BI-20a for a discussion of potential bird-strike issues associated with bright lights or tall buildings). However, Project implementation and construction-related activities including, but not limited to, grading, materials laydown, facilities construction, vegetation removal, and construction vehicle traffic may result in loss of a special-status and/or legally protected avian species' active nest and/or mortality of the nest's occupants. Due to the relatively low regional populations of any special-status species that might nest on the site, the loss of active nests of a special-status bird would be significant. Although most other, non-special-status birds that may nest on the site are more common regionally, and the Project would provide a net benefit to many protected bird species, including breeding, migrant, and wintering birds, as a result of habitat enhancements, impacts to active nests of any native bird would be considered significant due to these species' protection by the MBTA and *California Fish and Game Code*.

To reduce these impacts the following mitigation measures would be implemented:

MM BI-6a.1 *Impact Avoidance and Pre-Construction Surveys for Nesting Special-Status and Legally Protected Avian Species. The following measures shall be implemented by the Project Applicant to avoid impacts to nesting birds.*

1. *Not more than 15 days prior to construction activities that occur between February 1 and August 31, surveys for nesting birds shall be conducted by a qualified biologist (one familiar with the breeding biology and nesting habits of birds that may breed in the Project vicinity) that is selected by the Project Applicant, and approved by the City/Agency. Surveys shall cover the entire area to be affected by construction and the area within a 250-foot buffer of construction or ground-disturbing activities. The results of the surveys, including survey dates, times, methods, species observed, and a map of any discovered nests, shall be submitted to the City/Agency. If no active avian nests (i.e. nests with eggs or young) are identified on or within 250 feet of the limits of the disturbance area, no further mitigation is necessary. Phased construction work shall require additional surveys if vegetation or building removal has not occurred within 15 days of the initial survey or is planned for an area that was not previously surveyed. Alternatively, to avoid impacts, the Project Applicant shall begin construction after the previous breeding season for local raptors and other special-status species has ended (after August 31) and before the next breeding season begins (before February 1).*
2. *If active nests (with eggs or young) of special-status or protected avian species are found within 250 feet of the proposed disturbance area, a minimum 250-foot no-disturbance buffer zone surrounding active raptor nests and a minimum 100-foot buffer zone surrounding nests of other special-status or protected avian species shall be established until the young have fledged. Project activities shall not occur within the buffer as long as the nest is active. The size of the buffer area may be reduced if a qualified biologist familiar with the species' nesting biology (as approved by the City/Agency) and CDFG determine it would not be likely to have adverse effects on the particular species.*

Alternatively, certain activities may occur within the aforementioned buffers, with CDFG concurrence, if a qualified biologist monitors the activity of nesting birds for signs of agitation while those activities are being performed. If the birds show signs of agitation suggesting that they could abandon the nest, activities would cease within the buffer area. No action other than avoidance shall be taken without CDFG consultation.

3. *Completion of the nesting cycle (to determine when construction near the nest can commence) shall be determined by a qualified biologist experienced in identification and biology of the specific special-status or protected species.*

MM BI-6a.2 *Burrowing Owl Protocol Surveys and Mitigation. Because burrowing owls may take refuge in burrows any time of year, species-specific measures are necessary to avoid take of this species. The following measures shall be undertaken by the Project Applicant to protect burrowing owls.*

Prior to construction activities, focused pre-construction surveys shall be conducted for burrowing owls where suitable habitat is present within the construction areas. Surveys shall be conducted by a qualified biologist (i.e., one who is familiar with burrowing owl ecology and experienced in performing surveys for them, as approved by the City/Agency) no more than 30 days prior to commencement of construction activities. These surveys shall be conducted in accordance with the burrowing owl survey protocol contained within California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines, or any more current equivalent should new guidelines be released before construction.

1. *If no occupied burrows are found in the survey area, a letter report documenting survey methods and findings shall be submitted to the City/Agency and CDFG, and no further mitigation is necessary.*
2. *If unoccupied burrows are found during the non-breeding season, prior to construction activities, the Project Applicant shall collapse the unoccupied burrows, or otherwise obstruct their entrances to prevent owls from entering and nesting in the burrows. This measure would prevent inadvertent impacts during construction activities.*
3. *If occupied burrows are found, a letter report documenting survey methods and findings (including a map showing the locations of the occupied burrows) shall be submitted to the City/Agency and CDFG. Impacts to the burrows shall be avoided by providing a construction-free buffer of 250 feet during the nesting season (February 1 through August 31). A buffer of 165 feet from the active burrows should be provided during the non-breeding season (September 1 through January 31) if feasible, though a reduced buffer is acceptable during the non-breeding season as long as construction avoids direct impacts to the burrow(s) used by the owls. The size of the buffer area may be reduced if the CDFG determines it would not be likely to have adverse effects on the owls. No Project activity shall commence within the buffer area until a qualified biologist (as approved by the City/Agency) confirms that the burrow is no longer occupied. If the burrow is occupied by a nesting pair, as recommended by the California Burrowing Owl Consortium's April 1995* Burrowing Owl Survey Protocol and Mitigation Guidelines*, a minimum of 6.5 acres of foraging habitat contiguous (immediately adjacent) to the burrow shall be maintained until the nesting season is over. If the foraging habitat contiguous to the occupied burrow is currently less than 6.5 acres, the entire foraging habitat shall be maintained until the nesting season is over.*
4. *If impacts to occupied burrows are unavoidable, passive relocation techniques approved by CDFG shall be used to evict owls from burrows within the construction area prior to construction activities. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist (as approved by the City/Agency) verifies through non-invasive methods that juveniles from the occupied burrows are foraging independently and are capable of independent survival, or verifies the owls have not yet laid eggs. If any breeding owls must be relocated (i.e., after the nesting*

season has ended), mitigation of impacts to lost foraging and nesting habitat for relocated pairs shall follow guidelines provided in the California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines, which depending upon conditions detailed in the guidance (such as mitigation habitat quality), range from 7.5 to 19.5 acres per pair. This mitigation may take the form of the purchase of credits in a burrowing owl mitigation bank or the preservation and management of the required habitat acreage on site (e.g., in the Grasslands Ecology Park) or off site. If mitigation is provided via on-site or off-site habitat preservation and management, a Burrowing Owl Habitat Management Plan shall be prepared by a qualified biologist and submitted to the CDFG for review and approval, along with a copy to the City/Agency. This plan shall detail the location of the mitigation site, the means of preservation of the site (i.e., via a conservation easement), any enhancement and management measures necessary to ensure that habitat for burrowing owls is maintained in the long term, a monitoring program, and the size of an endowment established for the long-term maintenance of the site.

Implementation of mitigation measures MM BI-6a.1 and MM BI-6a.2 would reduce the effects of Project construction and implementation on nesting special-status and legally protected avian species by surveying for, identifying, and avoiding occupied nests and delaying construction if necessary to prevent nest abandonment, and/or providing a buffer zone around occupied nests to ensure that disturbance from construction activities do not result in the loss of individuals or destruction of nests or eggs. In addition, mitigation measure MM BI-6a.2 would require focused surveys for burrowing owls and specifies active and passive impact avoidance measures to avoid impacting this species and replace lost habitat. Specifically, if these species are identified nesting within the site, mitigation measures would implement construction buffers to protect occupied burrows, eggs, and young, as dictated by site-specific conditions in consultation with CDFG. Implementation of these mitigation measures would reduce potential adverse effects to less-than-significant levels by avoiding the loss of special-status or legally protected nesting species.

Impact of Hunters Point Shipyard Phase II

Impact BI-6b **Construction at HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on any bird species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (Less than Significant with Mitigation) *[Criterion N.a]***

Similar to development at Candlestick Point, construction-related activities including, but not limited to, grading, materials laydown, facilities construction, vegetation removal, and construction vehicle traffic may result in loss of a special-status and/or legally protected avian species' active nest and/or mortality of the nest's occupants; this would be considered a significant impact. Implementation of mitigation measures MM BI-6a.1 and MM BI-6a.2 (as detailed in Impact BI-6a), both at HPS Phase II and Yosemite Slough, would reduce the effects of Project construction and implementation on nesting special-status and legally protected avian species to less-than-significant levels.

A resident pair of American peregrine falcons has been observed successfully nesting on the Re-gunning crane on Parcel D of HPS Phase II. The Project would not remove the Re-gunning crane on Parcel D and, therefore, would not remove the nesting site. However, construction-related activities such as noise and light generating activities may disturb peregrine nesting activities. Peregrines are a state-listed endangered species (though the California Fish and Game Commission recently voted for delisting) and fully protected

under the *California Fish and Game Code*. If Project-generated disturbance is high enough, this pair of falcons could abandon the nest site entirely; due to the relatively low regional populations of this species, the loss of eggs or young due to abandonment of an active nest would be considered a substantial adverse effect and a significant impact. However, researchers at the Santa Cruz Predatory Bird Research Group[812,813] who were contacted about this Project's potential impact to this species expressed their professional opinion that like many other raptors, these peregrine falcons are expected to continue normal nesting activities if the nest site is left alone. Mitigation measure MM BI-6b would ensure effects of Project construction to nesting peregrine falcons are reduced to a less-than-significant level by identifying active nests during pre-construction surveys, delaying construction (if necessary) to limit disturbance.

MM BI-6b *American Peregrine Falcon Nest Protection Measures. To protect the nest of peregrine falcons during construction, the following measures shall be implemented by the Project Applicant prior to construction or other disturbance within 500 feet of the Re-gunning crane nest.*

1. *Not more than 30 days prior to construction activities that occur between February 1 and August 15, surveys for nesting peregrine falcons shall be conducted on the Re-gunning crane, and within a 500-foot buffer surrounding the potential nesting location. Surveys shall be performed by a qualified biologist (i.e., one familiar with falcon biology and nesting) that is selected by the Project Applicant, and approved by the City. The results of the surveys shall be submitted to the City/Agency and the CDFG. If no active peregrine falcon nests, eggs, or breeding activity, are identified on or within 500 feet of the limits of the disturbance area, no further mitigation is necessary. Alternatively, to avoid impacts, the Project Applicant can begin construction after the previous breeding season has ended (after August 31) and before the next breeding season begins (before February 1).*
2. *If active peregrine nests or breeding activity are observed within the survey area, a minimum 250-foot no disturbance buffer zone surrounding the nesting location shall be established until the young have fledged. Within this buffer, no Project construction activities shall occur while the nest is active. The size of the buffer area may be reduced if a qualified biologist and CDFG determine it would not be likely to have adverse effects on the falcons. No action other than avoidance shall be taken without CDFG consultation.*
3. *No new Project construction activity shall commence within the buffer area until young have fledged and the nest is no longer active, or until nesting has been terminated for reasons unrelated to Project activities. Completion of the nesting cycle shall be determined by a qualified biologist who is experienced in peregrine falcon breeding biology (as determined by the City/Agency).*

Implementation of mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would reduce the effects of Project construction and implementation on nesting special-status and legally protected avian species to less-than-significant levels.

[812] Glenn Stewart, Coordinator, UCSC Predatory Bird Research Group. E-mail correspondence July 13, 2009.
[813] The Santa Cruz Predatory Bird Research Group was founded to help restore a peregrine falcon population that had plummeted to just two known breeding pairs in California. SCPBRG conducts research to monitor and develop innovative management techniques and strategies to accelerate the recovery of peregrine falcon populations and other predatory birds.

Impact BI-7: Foraging Habitat for Raptors

Impact of Candlestick Point

Impact BI-7a **Construction at Candlestick Point would not have a substantial adverse effect on the quantity and quality of suitable foraging habitat for raptors. (Less than Significant) *[Criterion N.a]***

Construction on Candlestick Point would remove approximately 5.13 acres of non-native grasslands within Candlestick Point that serve as foraging habitat for grassland-associated raptors such as the red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*). Maximum counts (per survey) of eight red-tailed hawks and two American kestrels were recorded during the Yosemite Slough Watershed Wildlife surveys. Alteration of grassland habitat would also cause local reductions in habitat for prey of these raptors as well, in the areas being converted from grassland to developed uses. However, the majority of construction activities associated with Candlestick Point would not occur within grasslands and associated suitable raptor foraging habitat; rather, most of the Study Area's existing grasslands occur in areas that would not be transferred from CPSRA parkland and would, therefore, not be affected by Project activities. Therefore, adverse effects of development at Candlestick Point on raptor foraging habitat would be less than significant. No mitigation is required.

In addition, the Project's proposed ecological enhancements (as detailed in Impact BI-2), which would be refined in the Project's Draft Parks, Open Space, and Habitat Concept Plan, include measures to restore and manage areas that would be highly suitable as raptor foraging habitat. These measures would be required by MM BI-7b if this mitigation measure is adopted. The Project's enhancement of non-native grasslands that would be suitable replacement foraging habitat would, overall, be beneficial to grassland-associated raptors and more than offset any adverse effects from the removal of non-native grasslands at Candlestick Point.

Impact of Hunters Point Shipyard Phase II

Impact BI-7b **Implementation of the Project at HPS Phase II would not have a substantial adverse effect on the quantity and quality of suitable foraging habitat for raptors. (Less than Significant with Mitigation) *[Criterion N.a]***

Project activities associated with HPS Phase II would involve the creation of a Grasslands Ecology Park on the southern portion of HPS. Landscaping associated with creation of this park would alter approximately 43 acres of non-native grasslands within the HPS Phase II that currently serve as raptor foraging areas. As historic raptor foraging areas within the City have been reduced due to the conversion of open space to urbanized environments, permanent loss of suitable foraging habitat would be considered a substantial adverse effect.

However, the Project's proposed ecological enhancements (as detailed in Impact BI-2), which would be refined in the Project's Draft Parks, Open Space, and Habitat Concept Plan, include measures to restore and manage areas that would be highly suitable as raptor foraging habitat. Specifically, the Project's impacts to 43 acres of non-native grasslands that currently serve as raptor foraging habitat would occur as a result of enhancements that would be made to create a variety of habitats, including extensive grasslands, within the Grasslands Ecology Park. At least 43 acres of the Grasslands Ecology Park would be enhanced by

removal of invasive plants and restoration of native-dominated grasslands, and this area would be managed specifically for grassland-associated species. As a result, it would provide enhanced foraging opportunities for raptors and enhanced habitat for their prey when compared to the unmanaged, heavily disturbed non-native grasslands that currently occupy most portions of the HPS Phase II that are not already developed. Management of grasslands for grassland-associated prey species such as small mammals would benefit raptors such as American kestrels, red-tailed hawks, and barn owls that frequently forage in grasslands. Throughout the Project site, including parks and open space areas on both Candlestick Point and HPS Phase II, approximately 10,000 net new trees (more than four times the number currently present in the Project area) would be planted at the Project site and in the community. Many of these trees would be suitable for raptor perching, some of which would provide raptor nest sites as they mature. As discussed previously, the Project's planting of trees and shrubs would increase the abundance of smaller birds on the site, and increases in the general abundance of migratory birds as a result of shrub and tree planting would increase prey for raptors such as Cooper's hawks, sharp-shinned hawks, and merlins that specialize on birds, thus enhancing the quality of foraging habitat for these raptors. Because habitat use by red-shouldered hawks (*Buteo lineatus*) can be limited by perch availability in vast open areas, the introduction of perches by planting of trees near grasslands is expected to enhance foraging habitat conditions on large open areas such as southern HPS Phase II, as has been documented in southern California.[814]

The Project's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b shall be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur.

MM BI-7b *Enhancement of Raptor Foraging Habitat. The Draft Parks, Open Space, and Habitat Concept Plan shall implement, at a minimum, the following measures in open space areas outside the CPSRA, and if allowed, within the CPSRA area:*

- ***Restoration and Management of Grasslands:*** *To maintain grassland-associated wildlife species on the site, grasslands extensive enough to support such species shall be maintained and enhanced through the restoration of native grasses. Such grassland habitat shall not be well manicured or regularly mown. No trees shall be planted within such areas, and shrub cover would be limited to a few small, scattered patches of low-statured coastal scrub plants. At a minimum, replacement of non-native grassland impacted at HPS Phase II with native-dominated grassland shall occur at a ratio of 1:1 (1 acre of native-dominated grassland restored: 1 acre of non-native grassland impacted).*
- ***Increase in Tree/Shrub Cover:*** *Trees and shrubs (particularly natives) shall be planted and maintained outside the designated grassland restoration area to provide foraging habitat for raptors and other migratory birds, and cover for mammals, reptiles, and smaller birds that may serve as raptor prey. While native vegetation shall be favored, site-appropriate non-native trees and shrubs that provide food or structural resources that are particularly valuable to native wildlife shall also be considered. Approximately 10,000 net new trees shall be planted at the Project site and in the community, in addition to trees that will be replaced as required by the Urban Forestry Ordinance or MM BI-14a.*

[814]Bloom, P. H. and M. D. McCrary. 1996. The urban Buteo: red-shouldered hawks in southern California. Pages 31-39 in D. Bird, D. Varland, and J. Negro (eds.), Raptors in Human Landscapes. Academic Press.

The elements identified above shall be reviewed and approved by a qualified biologist (one familiar with the ecology of the Project site), and the Draft Parks, Open Space, and Habitat Concept Plan shall be implemented during construction of the Project. This plan shall be approved by the Agency prior to construction, and its preparation and implementation shall be the financial responsibility of the Project Applicant.

The Project's ecological enhancements (as detailed in the Draft Parks, Open Space, and Habitat Concept Plan), the requirements specified in mitigation measure MM BI-7b, and new and improved parkland, would provide both raptor foraging opportunities and enhanced raptor and raptor prey habitat. Consequently, adverse effects to raptor foraging habitat would be less than significant. Further, these Project improvements would result in a net increase in the quality of suitable raptor foraging habitat, as well as providing ancillary habitat improvement benefits to their prey species (small mammals, birds, and insects) that could result in a higher prey base for raptors within HPS Phase II. Overall, with mitigation, the effect of the Project on raptors is expected to be beneficial.

Impact BI-8: Terrestrial Mammals: Western Red Bat

Impact of Candlestick Point

Impact BI-8a **Construction at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on the western red bat, a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (Less than Significant) *[Criterion N.a]***

The only special-status bat species with the potential to occur within the Study Area is the western red bat. Potential roosting habitat for this species is present within the Project site in the mature trees where bats would roost in the foliage during migration and during the winter months (August–April). Construction activities that would remove these potential roosting sites could result in a small number of individuals being displaced, injured, or killed. However, several factors need to be taken into account when assessing the potential significance of the displacement or potential loss of a limited number of these individuals:[815]

1. This species is not a communal rooster, and any one tree would not be expected to contain large numbers of this species. Thus, any impacts to individuals would be very limited on a per-tree basis.
2. This species is highly affiliated with riparian communities that are dominated by mature trees with stands that are greater than 50 meters wide (i.e., red bat populations require fairly extensive stands of riparian forest). Consequently, the habitat on site is not of high quality for roosting or foraging and not essential to the species' survival or reproduction. As a result, few individuals are likely to be present on the site at any one time, and the number of individuals that could be directly impacted by the Project would be very low.
3. This species is not known to breed along the coast and is thought to migrate out of coastal regions to breed. Thus, the habitat on site would not be used for breeding and young would not be impacted.
4. Individuals roost in the canopy, generally well above any work areas and are averse to human disturbances and noise. Thus, if individuals were present they would not be directly impacted by tree

[815] Pierson, E.D., W.E. Rainey and C. Corben. 2006. Distribution and status of western red bats (*Lasiurus blossevillii*) in California. Calif. Dept. Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report 2006-04, Sacramento, CA 45 pp.

removal machinery as they are highly sensitive to noise and disturbance and would likely disperse to other areas while the trees are being removed.

5. The Central Valley of California, particularly the Sacramento and San Joaquin drainages and the lower reaches of the large rivers that drain the Sierra Nevada (i.e., Tuolumne, Merced, and likely the American and Cosumnes), take on disproportional importance for the future viability of this species. Thus, from an ecological sense, the Project would not impact critical range of this species or individuals occupying those areas.

Consequently, while removal of large trees could lead to disturbance and mortality of a very limited number of this species, the loss or disturbance would not represent a substantial adverse effect as it would not substantially reduce the habitat of this species, cause its population to drop below self-sustaining levels, or reduce its range. Impacts would be less than significant, and no mitigation is required.

In addition, the Project's Draft Parks, Open Space, and Habitat Concept Plan identifies ecological enhancement measures, including the planting of approximately 10,000 net new trees at the Project site and in the community, many of which would be suitable roosting habitat for this species, and result in an increase in potential roosting sites. These measures would be required by MM BI-7b. In addition, mitigation measure MM BI-14a requires the replacement of removed trees at a 1:1 ratio. With implementation of MM BI-7b and MM BI-14a, the effect of construction activities at Candlestick Point on the western red bat would be expected to be beneficial.

Impact of Hunters Point Shipyard Phase II

Impact BI-8b **Construction at HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on the western red bat, a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (Less than Significant) *[Criterion N.a]***

Similar to development at Candlestick Point, potential roosting habitat for this species is present within the Project site in the mature trees where bats would roost in the foliage during migration and the winter months (August—April). Construction activities that would remove these potential roosting sites could result in a small number of individual being displaced, injured, or killed. However, as detailed in Impact BI-8a, while removal of large trees could lead to disturbance and mortality of a very limited number of this species, the loss or disturbance would not represent a substantial adverse effect as it would not substantially reduce the habitat of this species, cause its population to drop below self-sustaining levels, or reduce its range. Impacts would be less than significant, and no mitigation is required. Further, as discussed in Impact BI-8a, with implementation of MM BI-7b and MM BI-14a, the effect of construction activities on the western red bat would be expected to be beneficial.

Impact BI-9: Marine Mammals and Fish

Impact of Candlestick Point

Impact BI-9a **Pile driving associated with construction at Candlestick Point would not have a substantial adverse effect either directly or through habitat modifications, on marine mammals or fish identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (No Impact) *[Criterion N.a]***

Development in Candlestick Point has no in-water components that require pile driving and, therefore, would have no substantial adverse effects to sensitive fish or marine mammals as a result of pile driving. No impact would occur, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-9b **Pile driving associated with construction of the marina and the Yosemite Slough bridge would not have a substantial adverse effect at HPS Phase II, either directly or through habitat modifications, on marine mammals or fish identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (Less than Significant with Mitigation) *[Criterion N.a]***

It is possible that any of the sensitive fish species listed in the Setting section could be found within aquatic habitats of HPS Phase II during certain times of year. Those include green sturgeon, Chinook salmon, steelhead, and longfin smelt. Marine mammals such as the harbor seal and California sea lion could also be present. Pacific herring and a number of other non-special-status fish could also occur in these waters. The high noise levels generated by pile driving have the potential to disturb, injure, or kill these species.

Construction of the marina would require the use of a pile driver to install the new pilings required to anchor the floats. New piles may also need to be driven to support and stabilize existing wharves if future investigations identify weaknesses in existing support structures. When piles are struck by a hammer, they generate ground vibrations and sound. When this occurs in the air, we hear the result. When this occurs in water, the effect is transmitted as a pressure wave. The magnitude of this wave is dependent on the type of pile being installed (solid, hollow, concrete, wood, steel) and the hammer being used (impact or vibratory). The combination that generates the strongest wave is a hollow steel pile struck with an impact hammer.

The in-water pressure wave, if of sufficient magnitude, can injure or kill fish. Pressure waves have an actual force associated with them and the stronger the force, the more likely they are to damage sensitive tissues in fish. Pressure waves interact with fish in the water column generating effects from behavioral such as avoidance, to physiological such as stress, temporary loss of hearing, rupture of swim bladders (air pockets that are used for buoyancy), formation of bubbles in the circulatory system and corresponding rupturing of blood vessels, traumatic brain injuries, to death.[816] Species with swim bladders are the most susceptible although ear structures of any species can be damaged. Current NMFS guidelines indicate that 180 decibels generating 1 micropascal

[816] Hasting, M.C. and A.N. Popper. Effects of sound on fish. Prepared for California Department of Transportation, January 28, 2005.

can injure or kill fish.[817,818] Marine mammals, which have sensitive hearing, can easily be disturbed by sound-generated pressure waves although it would be unlikely to cause injury or mortality.

Construction of the marina could require the installation of about 675 new pilings.[819] The conceptual design of the marina does not specify pile installation methods, type of pile, or the season during which installation could occur. Based on experience with other marina improvements in San Francisco Bay, steel piles are likely required for at least some structural elements of the marina. As was discussed above, installation of these piles with an impact hammer has the potential to generate substantial sound pressure waves. Installation of pilings that resulted in generation of sound pressure waves above the threshold indicated could result in the mortality of any of the sensitive species of fish listed above. Additionally, the noise would disrupt normal behavior patterns of marine mammals, which would be a violation of the *Marine Mammal Protection Act*. Either of these effects would be considered a potentially significant impact.

The current design for the Yosemite Slough bridge would have 20 columns supported by steel piles. However, current Yosemite Slough bridge designs would require installation of coffer dams (temporary structures typically constructed with sheet-pilings[820] that separate a worksite from the water and allow it to be dewatered). The bridge piles would be driven behind dewatered coffer dams. Because piles would be driven behind the coffer dam and, therefore, out of the water, pile installation would not result in generation of in-water sound pressure waves that could injure fish species, and ground pressure waves produced by pile driving within a dewatered coffer dam are not expected to injure fish.

To reduce these impacts the following mitigation measures would be implemented:

MM BI-9b *Pile Driving Design and Minimization Measures. To minimize impacts on fish and marine mammals, the Project Applicant shall implement the following measure to reduce the amount of pressure waves generated by pile driving. The first set of measures shall be implemented during Project design. The second set of measures shall be implemented during construction.*

Design Measures:

1. *Engineer structures to use fewer or smaller piles, where feasible, and preferably, solid piles.*
2. *Design structures that can be installed in a short period of time (i.e., during periods of slack tide when fish movements are lower).*
3. *Do not use unsheathed creosote-soaked wood pilings.*

The City/Agency, with consultation from a qualified biologist who is familiar with marine biology, as approved by the City/Agency, shall review the final Project design to ensure that these design requirements have been incorporated into the Project.

Construction Measures:

1. *Drive piles with a vibratory device instead of an impact hammer if feasible.*

[817] A micropascal is a measure of pressure per unit area where 1 micropascal equals 0.0000145 pounds per square inch.
[818] NMFS. San Francisco Bay Project Impact Evaluation System. Website: http://mapping2.orr.noaa.gov/website/portal/pies/piledriving.html. Accessed February 16, 2009.
[819] Devick, C. Moffat & Nichol. E-mail to C. Mason and D. Ebert, January 15, 2009 with fill volumes for the Marina.
[820] Sheet piles are flat metal "boards" that are driven into the substrate with a pile driver. They interlock with each other to form a vertical water tight wall.

2. *Restrict driving of steel piles to the June 1 to November 30 work window, or as otherwise recommended by NMFS (driving of concrete piles would not be subject to this condition).*
3. *Avoid installation of any piles during the Pacific herring spawning season of December through February. Consult with the CDFG regarding actual spawning times if pile installation occurs between October and April.*
4. *If steel piles must be driven with an impact hammer, an air curtain shall be installed to disrupt sound wave propagation, or the area around the piles being driven shall be dewatered using a cofferdam. The goal of either measure is to disrupt the sound wave as it moves from water into air.*
5. *If an air curtain is used, a qualified biologist shall monitor pile driving to ensure that the air curtain is functioning properly and Project-generated sound waves do not exceed the threshold of 180-decibels generating 1 micropascal (as established by NMFS guidelines). This shall require monitoring of in-water sound waves during pile driving.*
6. *Unless the area around the piles is dewatered during pile driving, a qualified biologist shall be present during driving of steel piles to monitor the work area for marine mammals. Driving of steel piles shall cease if a marine mammal approaches within 250 feet of the work area or until the animal leaves the work area of its own accord.*

Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities by recommending the type of piles to use to minimize sound impacts, provide for an alternative method of installation to minimize sound impacts, requiring installation during an agency-approved construction window when fish are least likely to be present and thus avoid the bulk of potential impacts, and require a construction monitor to ensure all measures, including sound monitoring are complied with. This measure would not be required for the Yosemite Slough bridge if piles were driven in dry conditions behind coffer dams, as is proposed, no aquatic pressure waves would be generated. Implementation of this mitigation measure would reduce potential adverse effects to less-than-significant levels.

Impact BI-10: Mollusks

Impact of Candlestick Point

Impact BI-10a **Construction at Candlestick Point would require the removal of hard substrates (riprap) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species. (Less than Significant) *[Criterion N.a]***

Development at Candlestick Point would require limited in-water work. This work would be associated with the shoreline treatments; specifically, the placement of additional (rock) rip-rap, ACB mats, and/or marsh soils to improve the existing riprap shoreline edge for the purpose of reducing shoreline erosion and flooding and improving shoreline habitat. Shoreline treatments would require the removal of some substrate in areas where the Bay is eroding the existing shoreline. In these areas, hard substrates suitable for oyster settlement (rock, riprap, sheet pile, etc) would be removed, potentially directly impacting native oysters. However, in many areas, the same shoreline treatments would entail replacement of this substrate with a similar material that would also be suitable for oyster settlement. These shoreline improvements would temporarily affect substrate used by native oysters; however, habitat for substrate would be replaced with equal amounts of equivalent habitat after the treatments are complete. This would not substantially

reduce populations or available habitat. Consequently, Candlestick Point would not have a substantial adverse effect on native oysters. Impacts would be less than significant, and no mitigation is required.

In other areas, particularly along the northern edge of the Candlestick Point shoreline, the placement of ACB mats and/or marsh soils to enhance marsh development could result in the replacement of hardened substrate that may currently provide settlement habitat for oysters with softer marsh substrate that would not support oysters. No large concentrations of oysters are known to occur along the Candlestick Point shoreline, and thus marsh restoration is not expected to result in substantial declines in oyster abundance. Restoration of salt marsh along the Candlestick Point shoreline would increase the input of organic material in the area to some extent, and improvement of the shoreline would reduce erosion, which currently produces turbidity that is likely detrimental to native oysters. Thus, these shoreline improvements would confer some benefits to oysters.

Impact of Hunters Point Shipyard Phase II

Impact BI-10b **Construction at HPS Phase II would require removal of hard substrates (docks, riprap, seawalls, pilings, etc) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species. (Less than Significant) *[Criterion N.a]***

Native oysters are typically found on hard substrates (rock, pilings, breakwaters, etc.) in shallow intertidal and subtidal habitats along the shoreline of the Bay. Any actions that would require the modification of existing hard substrates would have the potential to impact native oysters. Implementation of the Project would also remove small sections of Piers 1, 2, and 3 to separate them from the shore and prevent public access (refer to Figure II-4 [Proposed Land Use Plan]). Those piers provide pilings that are considered a suitable substrate for oyster settlement and thus could be supporting native oysters[821]. The removal of this small section of the piers would, therefore, result in the loss of a very small amount of oyster habitat and potentially of individual oysters. In addition, the Project also includes plans to repair portions of existing seawall structures, place buttress fill (below the water surface) for structural stability of seawall structures, and modify several piers and drydocks along the shoreline of HPS Phase II. These shoreline improvements could affect native oysters and their habitat. As discussed for Candlestick Point above, the end result of shoreline improvements in some areas would be hard substrate similar to what is currently present, and thus equally suitable for oyster colonization. In other areas, the placement of ACB mats and/or marsh soils to enhance marsh development could result in the replacement of hardened substrate that may currently provide settlement habitat for oysters with softer marsh substrate that would not support oysters. These shoreline improvements would temporarily affect substrate used by native oysters, but would not substantially reduce populations or available habitat. Consequently, construction activities at HPS Phase II would not have a substantial adverse effect on native oysters.

In addition, the Project proposes to create a new marina, which would require installation of two breakwater sections (ranging between 300 and 650 feet in length)[822] that would provide suitable settlement habitat for

[821] Couch, D., and T.J. Hassler. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Northwest)—Olympia oyster. US Fish and Wildlife Service Biol. Rep. 82(11.124). US Army Corps of Engineers, TR EL-82-4. 8 pp.
[822] Devick, Christopher, Moffat-Nichol email to Therese Brekke of Lennar Urban and Terri Vitar of PBS&J regarding length of marina breakwater, dated July 23, 2009.

native oysters. Consequently, HPS Phase II construction would result in a series of offsetting impacts; temporary impacts associated with the removal of suitable oyster habitat, followed by the replacement of these areas with new suitable habitat. The new breakwaters would be considered suitable habitat for oyster settlement equating to about 0.10 acre of new habitat. In addition, the construction of approximately 5,700 feet of a floating dock system and 80 feet of gangways that would also provide new suitable habitat for oyster settlement. Therefore, although temporary impacts to oyster habitat would occur during construction, HPS Phase II effects on native oysters would be less than significant and no mitigation is required.

Impact of Yosemite Slough Bridge

Impact BI-10c **Construction of the Yosemite Slough bridge may require removal of hard substrates (docks, riprap, seawalls, pilings, etc) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species. (Less than Significant)** ***[Criterion N.a]***

Construction of the Yosemite Slough bridge may result in the removal of or modifications to a small amount of riprap where the bridge abutments would be located. Riprap below the MHW elevation may be used by native oysters. However, riprap would also be placed near the abutments once they are constructed, thus replacing any oyster substrate that is temporarily impacted or removed. Furthermore, the bridge piers would provide a hard substrate that could potentially serve as substrate for oyster colonization. Thus, the construction of the Yosemite Slough bridge would not result in the permanent loss of oyster habitat, and could instead result in a net gain in potential substrate for oysters at that location. Therefore, although temporary impacts to oyster habitat would occur during construction, the Yosemite Slough bridge would not have a substantial adverse effect on native oysters. Impacts would be less than significant, and no mitigation is required.

Impact BI-11: Special-status Fish

Impact of Candlestick Point

Impact BI-11a **Construction at Candlestick Point would not have a substantial adverse effect on designated critical habitat for green sturgeon and Central California Coast steelhead, and would not result in impacts to individuals of these species as well as Chinook salmon and longfin smelt through disturbance and loss of aquatic and mudflat habitat as a result of construction of shoreline revetments. (Less than Significant with Mitigation)** ***[Criteria N.a and N.d]***

Development at Candlestick Point would require minor in-water work associated with the shoreline treatments. Work in these areas would require the repair of existing shoreline protection measures. All work would occur in relatively shallow water areas that are unlikely to support foraging special-status fish.[823] Still, the NMFS has considered the entire Bay in the site vicinity to be designated critical habitat for the green sturgeon and Central California Coast steelhead, and there is some possibility that individuals of these species, as well as other special-status fish such as Chinook salmon and longfin smelt, could be impacted by shoreline construction activities.

[823] Proposed Designation of Critical Habitat for the Southern Distinct Population Segment of North American Green Sturgeon, Draft Biological Report, National Marine Fisheries Service, September 2008.

Construction of shoreline protection measures would primarily entail the reconstruction of the existing shoreline. The new shoreline treatments would be designed to reduce erosion of the shoreline, and thus existing turbidity impacts from coastal erosion would be reduced by the Project. Some additional fill would be placed below the MHW elevation to reduce the slope of the shoreline, thus providing more beach and marsh habitat, following construction of the revetments. As a result, there would be a net decrease of approximately 0.42 acre of open waters along the shoreline of Candlestick Point. In addition, temporary impacts to aquatic habitat of these species, including designated critical habitat for the green sturgeon and Central California Coast steelhead, would occur as a result of increased turbidity and movement of materials within aquatic habitat along the shoreline during construction. Because of the regional rarity of these special-status fish, any impacts to individuals or to habitat used by these fish would be significant.

Implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2 (described above) would reduce the effects of construction-related activities to aquatic habitat by mitigating for the temporary and permanent loss of jurisdictional waters from the Project as a whole by requiring compensatory mitigation (i.e., creation and/or restoration), obtaining permits from the USACE, SFRWQCB, BCDC, and other agencies as applicable that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including aquatic habitats.

- Implementation of mitigation measure MM BI-12a.1 and MM BI-12a.2 would reduce effects of construction activities on special-status fish by avoiding in-water construction during periods when sensitive species are most likely to be present in waters of the Project site and by educating construction personnel regarding measures to be implemented to protect fish and their habitats. Implementation of these mitigation measures would minimize any adverse effects on aquatic habitat of special-status fish, including designated critical habitat for the green sturgeon and Central California Coast steelhead, during construction and compensate for any residual impacts to these species' habitats resulting from the Project as a whole, thus reducing impacts to special-status fish to less-than-significant levels.

Impact of Hunters Point Shipyard Phase II

Impact BI-11b **Construction at HPS Phase II would not have a substantial adverse effect on designated critical habitat for green sturgeon and Central California Coast steelhead, and would not result in impacts to individuals of these species as well as Chinook salmon and longfin smelt through temporary and permanent disturbance of aquatic and mudflat habitat during construction of shoreline revetments. (Less than Significant with Mitigation)** ***[Criteria N.a and N.d]***

Construction activities at HPS Phase II include elements that would impact designated critical habitat for green sturgeon and Central California Coast steelhead within the Bay, and there is some possibility that individuals of these species, as well as other special-status fish such as Chinook salmon and longfin smelt, could be impacted by these activities as well. Construction of the proposed marina (including breakwaters) in what is now open water would result in the loss of habitat for these special-status fish species. Construction of shoreline treatments and placement of fill in other locations around the perimeter of HPS would also affect a small amount of shallow, relatively low-quality foraging habitat for green sturgeon and steelhead, as discussed for Candlestick Point in Impact BI-11a above. Consequently, these elements of the Project would impact existing critical habitat for green sturgeon and Central California Coast steelhead.

Because of the regional rarity of all these special-status fish, any impacts to individuals or to habitat used by these fish would be significant.

Some Project features would reduce the Project's impacts to these special-status fish species and designated critical habitat. Some areas of shoreline that are currently sheet-pile walls would be modified, and portions of several piers would be removed to provide new aquatic habitat that could be used by these fish. A net increase of approximately 8 acres of new aquatic habitat would result. Furthermore, the new shoreline treatments would be designed to reduce erosion of the shoreline, and, thus, existing turbidity impacts from coastal erosion would be reduced by the Project.

Compensatory mitigation for impacts to aquatic habitat, which include habitat used by green sturgeon, Central California Coast steelhead, Chinook salmon, and longfin smelt, would be provided as described by mitigation measure MM BI-4a.1, and mitigation measure MM BI-4a.2 shall be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Implementation of mitigation measure MM BI-12a.1 and MM BI-12a.2 would reduce effects of construction activities on special-status fish by avoiding in-water construction during periods when sensitive species are most likely to be present in waters of the Project site and by educating construction personnel regarding measures to be implemented to protect fish and their habitats. Implementation of these measures would reduce potential adverse effects on special-status fish species to less-than-significant levels.

Impact of Yosemite Slough Bridge

Impact BI-11c **Construction of the Yosemite Slough bridge would not have a substantial adverse effect on designated critical habitat for green sturgeon and Central California Coast steelhead and would not result in impacts to individuals of these species, Chinook salmon, or longfin smelt through disturbance or loss of aquatic and mudflat habitat as a result of construction of shoreline revetments. (Less than Significant with Mitigation)** ***[Criteria N.a and N.d]***

Construction of the Yosemite Slough bridge would impact designated critical habitat for green sturgeon and Central California Coast steelhead through the construction of pilings required to support the bridge. Bridge impact areas are relatively shallow intertidal mud flats that are likely not suitable foraging habitat for either species. Those areas are likely too shallow to meet the depth or food PCEs for sturgeon and should not be considered critical habitat. Specifically, NMFS's own studies show that for juvenile green sturgeon in the Delta, relatively large numbers of juveniles were captured primarily in shallow waters from 1 to 3 meters (approximately 3.3 to 10 feet deep), indicating juveniles likely prefer depths deeper than those within the majority of the proposed bridge construction footprint for rearing and foraging.[824] Nevertheless, it is possible that green sturgeon and Central California Coast steelhead, and possibly other special-status fish such as Chinook salmon and longfin smelt, could forage in the vicinity of the proposed bridge during high tides. Therefore, construction of the bridge could impact these species due to temporarily increased turbidity and modification of mudflat habitat during construction and permanent loss of 0.11 acre of mudflat and aquatic habitat in the footprints of the bridge piers. In addition, shading from the bridge could adversely affect aquatic and mud flat habitat, and fish that use these habitats, under the bridge (refer to

[824] Proposed Designation of Critical Habitat for the Southern Distinct Population Segment of North American Green Sturgeon, Draft Biological Report, National Marine Fisheries Service, September 2008.

Impact BI-4c). Because of the regional rarity of all these special-status fish, any impacts to individuals or to habitat used by these fish would be significant.

As described under Impact BI-11b above, some Project components would benefit these fish by increasing the extent of open water in the Project area through removal of existing structures and by reducing coastal erosion. In addition, compensatory mitigation for impacts of the bridge to aquatic habitat would be provided as described by mitigation measure MM BI-4a.1 and MM BI-4c, and mitigation measure MM BI-4a.2 shall be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Implementation of mitigation measure MM BI-12a.1 and MM BI-12a.2 would reduce effects of construction activities on special-status fish by avoiding in-water construction during periods when sensitive species are most likely to be present in waters of the Project site and by educating construction personnel regarding measures to be implemented to protect fish and their habitats. Implementation of these measures would reduce potential adverse effects on special-status fish species to less-than-significant levels.

Impact BI-12: Essential Fish Habitat

Impact of Candlestick Point

Impact BI-12a **Construction at Candlestick Point would not have a substantial adverse effect on designated essential fish habitat through (EFH) or result in a substantial change in total available essential fish habitat through placement of riprap and other fill or through temporary water-quality impacts during construction. EFH is a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. (Less than Significant with Mitigation)** ***[Criterion N.b]***

The Bay adjacent to the Project site has been designated EFH in the Pacific Coast Salmon Plan,[825] Coast Pelagics Fishery Management Plan,[826] and Pacific Groundfish Fishery Management Plan.[827] These management plans include species such as northern anchovy (*Engraulis moradax*), Pacific herring, Pacific sardine, Chinook salmon, and a dozen species of groundfish [i.e., starry flounder (*Platichthys stellatus*), English and sand sole (*Parophrys vetulus* and *Psettichthys melanostictus* respectively), leopard shark (*Triakis semifasciata*), lingcod (*Ophidon elongates*), cabezone (*Scorpaenichthys marmoratus*), and various rockfish]. The only in-water portions of Candlestick Point are associated with shoreline treatments. Installation of shoreline treatments that require modification of the substrate within the Bay would be considered to result in changes to designated EFH. Installation of shoreline treatments would modify EFH due to modification of mudflat habitat and increased turbidity during construction. As shown in Table III.N-4, approximately 4.98 acres of aquatic habitat that would be considered EFH will be impacted by the project. The majority of these impacts would be temporary, as they would occur during replacement of the existing revetment

825 PFMC (Pacific Fisheries Management Council) 2003. Pacific Coast Salmon plan: Fishery management plan for commercial and recreational fisheries off the coasts of Washington, Oregon, and California as revised through amendment 14.
826 PFMC (Pacific Fisheries Management Council) 1998. The coastal pelagic species fishery management plan. As amended through 2006.
827 PFMC (Pacific Fisheries Management Council) 2008. Pacific coast groundfish fishery management plan for the California, Oregon, and Washington groundfish fishery as amended through amendment 19.

with similar structures. However, as described in Impact BI-11a above, these activities would result in a net decrease of approximately 0.42 acre of open waters along the shoreline of Candlestick Point. Although the EFH that would be temporarily impacted by construction at Candlestick Point represents a minute fraction of available EFH in the Bay, this impact would be substantial, in the absence of mitigation, due to the importance of EFH to the ecology of the Bay.

Impact BI-2 above described the less-than-significant impact of the Project to common fish, shellfish, and mollusks. Although impacts to the populations of common aquatic species would be less than significant, as described in Impact BI-2, construction at Candlestick Point would be considered to have a substantial adverse effect on EFH overall because the function of that habitat would be altered by the Project, potentially having longer-term consequences on aquatic habitat for both common and special-status aquatic species. Any loss of EFH that would result from construction activities at Candlestick Point would be mitigated via the compensatory mitigation for impacts to jurisdictional waters (mitigation measure MM BI-4a.1), and measures to avoid and minimize adverse effects to aquatic habitats, described in mitigation measure MM BI-4a.2, would further reduce potential adverse effects to EFH. To reduce this potential impact to less-than-significant levels, the following mitigation measures would also be implemented.

MM BI-12a.1 *Seasonal Restrictions on In-Water Work. In-water work when juvenile salmonids are moving through the estuary on the way to the ocean or when groundfish and prey species could be directly impacted shall be avoided. Because steelhead are potentially present, the allowed dredge window for this area of the San Francisco Bay is June 1 through November 30.*[828] *All in-water construction shall occur during this window. If completion of in-water work within this period is not feasible due to scheduling issues, new timing guidelines that shall be established and submitted to NMFS and CDFG for review and approval.*

MM BI-12a.2 *Worker Training. Personnel involved in in-water construction and deconstruction activities shall be trained by a qualified biologist (experienced in construction monitoring, as approved by the City/Agency) in the importance of the marine environment to special-status fish, birds, and marine mammals and the environmental protection measures put in place to prevent impacts to these species, their habitats, and Essential Fish Habitat. The training shall include, at a minimum, the following:*

- *A review of the special-status fish, birds, and marine mammals and sensitive habitats that could be found in work areas*
- *Measures to avoid and minimize adverse effects to special-status fish, birds, marine mammals, their habitats, and Essential Fish Habitat*
- *A review of all conditions and requirements of environmental permits, reports, and plans (i.e., USACE permits)*

Mitigation measure MM BI-12a.1 would reduce the effects of construction-related activities to EFH by establishing a construction window that would minimize impacts to fish by avoiding migration and breeding periods, and mitigation measure MM BI-12a.2 would ensure that personnel involved in construction and deconstruction activities are trained on measures to avoid and minimize adverse effects to special-status aquatic species and their habitats. Implementation of these mitigation measures, along with mitigation measures MM BI-4a.1 and MM BI-4a.2, would reduce potential adverse effects on EFH at Candlestick Point to less-than-significant levels.

[828] LTMS Environmental Work Windows Work Group. LTMS Informal work windows, Informal consultation preparation packet. Draft version 1.4. February 2004. Website: http://www.spn.usace.army.mil/conops/informal.pdf.

Impact of Hunters Point Shipyard Phase II

Impact BI-12b **Construction at HPS Phase II would not have a substantial adverse effect on designated essential fish habitat through (EFH) through placement of riprap and other fill, or through temporary water-quality impacts during construction. EFH is a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. (Less than Significant with Mitigation) *[Criterion N.b]***

The same three fishery management plans and the species covered in those plans discussed in the previous impact statement apply to HPS Phase II. The modifications to EFH that could arise from HPS Phase II are associated with the proposed marina, placement of rock fill to buttress existing bulkheads, and the shoreline treatments. Marina operations could affect EFH through potential impacts to water quality and fish habitat resulting primarily from spills or intentional discharges of fuel or other harmful substances from boats using, or fueling facilities associated with, the marina. The most substantial loss of EFH would result from the placement of rock buttress fill necessary to protect the integrity of existing bulkheads. Although aquatic habitat would remain above the buttresses, this rock would occupy existing fish habitat, and the Project would thus substantially modify EFH within the waters adjacent to the HPS Phase II site.

Overall, activities at HPS Phase II will affect 21.11 acres of aquatic habitat that would be considered EFH. However, in addition to activities resulting in fill of EFH, the Project also includes the removal of some shoreline structures (i.e., piers and/or bulkheads) and fill material that are currently present in jurisdictional areas. For example, portions of the Re-gunning pier and edges of bulkheads along much of the eastern part of HPS Phase II would be removed to create new open-water habitat. Although these areas are considered permanently impacted for the purposes of this impact assessment, since some fill would be placed along the new shoreline of these bulkheads for stabilization and restoration purposes, removal of structures and fill would restore approximately 8 acres of new aquatic habitat, more than offsetting the loss of EFH resulting from placement of fill for buttresses.

Other elements of HPS Phase II construction that could affect EFH are the shoreline treatments. Repairs to the seawall and other shoreline treatments proposed for HPS Phase II would result in modifications to EFH, both due to modification of substrate and mobilization of sediments during construction, but because these impacts are primarily temporary, are localized and often replace an existing failing structure with a similar structure, these repairs would not result in a substantial modification of the function of existing EFH. Also, shoreline improvements along the southern edges of HPS would reduce coastal erosion and associated turbidity, resulting in a long-term benefit to water quality and EFH. Collectively, these repairs and improvements of the Project are not considered to result in a substantial reduction in designated EFH.

Impact BI-2 above described the less-than-significant impact of the Project to common fish, shellfish, and mollusks. Although impacts to the populations of common aquatic species would be less than significant, as described in Impact BI-2, the HPS Phase II development would be considered to have a substantial adverse effect on EFH overall because the function of that habitat would be altered by the Project, potentially having longer-term consequences on aquatic habitat for both common and special-status aquatic species. Any loss of EFH that would result from construction activities at HPS Phase II would be mitigated via the compensatory mitigation for impacts to jurisdictional waters (mitigation measure

MM BI-4a.1) and, if necessary, mitigation for impacts to eelgrass (mitigation measure MM BI-5b.3). Measures to avoid and minimize adverse effects to aquatic habitats and eelgrass beds, described in mitigation measures MM BI-4a.2 and MM BI-5b.1 through MM BI-5b.4, would further reduce potential adverse effects to EFH. The measures described above to mitigate impacts to EFH at Candlestick Point (MM BI-12a.1 and MM BI-12a.2) will be implemented at HPS Phase II as well. Because activities at HPS Phase II involve more in-water work than at Candlestick Point, and involve the demolition of existing structures in and immediately adjacent to EFH, the following additional mitigation measures will also be implemented at HPS Phase II to reduce potential impacts to less-than-significant levels.

MM BI-12b.1 *Essential Fish Habitat Avoidance and Minimization Measures. The following mitigation measures have been adapted from Amendment 11 of the West Coast Groundfish Plan[829] and Appendix A of the Pacific Coast Salmon Plan.[830] Incorporation of the following, or equivalent mitigation as otherwise required by the USACE or NMFS, would reduce the impacts to Essential Fish Habitat (EFH) to a level considered less than significant. Unless modified by the federal permitting agencies (NMFS or USACE), these measures shall be implemented during construction by the Project Applicant. Any reporting required shall be specified in the USACE permits and reports shall be submitted to the USACE and NMFS.*

- *If dredging is required, permits will be obtained through the Dredged Material Management Office (DMMO) process, and the following mitigation from the Long-Term Management Strategy (LTMS) shall be implemented:*
  - *Dredging shall avoid areas with submerged aquatic vegetation (eelgrass beds or other EFH areas of particular concern) especially where the action could affect groundfish, prey of outmigrating juvenile salmon or groundfish, larval marine species, or habitat for native oysters*
  - *Sediments shall be tested for contaminants as per EPA and USACE requirements. Contaminated sediments shall be disposed of in accordance with EPA and USACE guidelines*
  - *Slopes of the dredged area shall be gradual enough so that sloughing is unlikely to occur. Verification of these conditions shall be achieved through follow-up bathymetric surveys*
  - *To minimize turbidity and potential resuspension of contaminated sediments, dredging shall use suction equipment, or similar equipment, when feasible. Where an equipment type may generate significant turbidity (i.e., clamshell), dredging shall be conducted using adequate engineering and best management practices to control turbidity. These include, but are not limited to, sediment curtains and tidal work windows.*
- *All construction equipment used in conjunction with in-water work (pipelines, barges, cranes, etc.) shall avoid wetlands, marshes, and areas of subaquatic vegetation (including eelgrass beds)*
- *Upland disposal options shall be considered for all spoils generated by on-site construction, especially if high levels of contaminants are present*
- *Maximize the use of clean dredged material for beneficial use opportunities, such as salt marsh restoration*
- *Use Best Management Practices (BMPs) for controlling pollution from marina operations, boatyards, and fueling facilities that meet, as applicable, the BMPs listed in the National*

[829] PFMC 1998. Essential Fish Habitat – West Coast Groundfish, Amendment 11.
[830] PFMC 1999. Appendix A: Identification and description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. *In* Pacific Coast Salmon Plan (1997) as amended through Amendment 14. Website: http://www.pcouncil.org/salmon/salfmp/a14.html.

Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating[831]

MM BI-12b.2 *Deconstruction/Construction Debris Recovery. A Seafloor Debris Minimization and Removal Plan shall be prepared by the Project Applicant and approved by the City/Agency, prior to initiation of in-water deconstruction (dismantling) or construction activities. The Plan shall be implemented during in-water deconstruction or construction activities, and such activities shall be monitored by a qualified biologist who is experienced in construction monitoring (as approved by the City/Agency). The Seafloor Debris Minimization and Removal Plan shall include, at a minimum:*

- *Debris field boundaries associated with deconstruction activities*
- *Identification of measures taken to minimize the potential for debris to fall into aquatic habitats (i.e., the use of netting below in-water construction or deconstruction areas)*
- *Deconstruction equipment, tools, pipes, pilings, and other materials or debris that are inadvertently dropped into the Bay, along with their descriptions and locations*
- *Circumstances requiring immediate cessation of deconstruction activities and immediate initiation of search and recovery efforts, including procedures for implementing those recovery efforts*
- *How lost debris that is to be removed post-deconstruction is to be identified, who will be conducting search and recovery operations, and the survey methods to be employed to locate lost equipment and materials*
- *Criteria that will be used to:*
  - *Determine whether recovery efforts are appropriate for the object being recovered and do not result in potential environmental impairment greater than if the debris was allowed to remain in place*
  - *When sufficient effort has been expended to recover a lost object(s) with no success and continued efforts to recover the seafloor debris have diminishing potential for success and/or result in environmental impairment greater than leaving the debris in place*
- *Person(s) responsible for implementing the Plan and making the determination on the type of recovery required*
- *How debris is to be disposed of or recycled*
- *Metrics for determining when recovery efforts will be considered complete*

Following completion of all post deconstruction recovery efforts for seafloor debris, a report shall be prepared by the Project Applicant and submitted to the City/Agency detailing, at a minimum, (1) recovery activities during deconstruction and post-deconstruction, (2) listings of all lost and recovered debris, (3) final disposition of recovered debris, and (4) discussion of what debris could not be recovered and why.

Mitigation measure MM BI-12b.1 would reduce the effects of construction-related activities to EFH by avoiding areas with submerged vegetation thereby protecting habitat, and managing construction equipment with Best Management Practices to prevent contamination. Mitigation measure MM BI-12b.2 would mandate the creation and implementation of a Seafloor Debris Removal Plan. This Plan shall include sufficient environmental protection measures to ensure effective recovery of lost Project debris and minimize potential environmental impacts posed by the debris, or debris recovery to designated EFH or other sensitive Bay habitats and biota (i.e., critical habitat and herring spawning habitats). Implementation of these mitigation measures would reduce potential adverse effects on EFH at HPS Phase II to less-than-significant levels.

[831] National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating. EPA 841-B-01-005, November 2001.

Impact of Yosemite Slough Bridge

Impact BI-12c **Construction of the Yosemite Slough bridge would not have a substantial adverse effect on designated essential fish habitat through (EFH) through placement of riprap and other fill, or through temporary water-quality impacts during construction. EFH is a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. (Less than Significant with Mitigation)** ***[Criterion N.b]***

Construction of the Yosemite Slough bridge would impact EFH through the construction of pilings required to support the bridge. As detailed in Table III.N-4, the amount of area impacted is approximately 1.28 acres of temporary impacts and 0.40 acre of permanent impacts, which includes both on site and off site areas. These impacts would have a substantial adverse effect on EFH because the function of portions

- of the impacted habitat would be permanently altered by the Project, a significant impact. In addition, shading from the bridge could adversely affect aquatic and mud flat habitat, and fish that use these habitats, under the bridge (refer to Impact BI-4c).

- Any loss or modification of EFH that would result from the Yosemite Slough bridge would be mitigated via the compensatory mitigation for impacts to jurisdictional waters (mitigation measure MM BI-4a.1 and MM BI-4c). Measures to avoid and minimize impacts to aquatic habitats, described in mitigation measure MM BI-4a.2, would further reduce impacts to EFH. To reduce these potential impacts to less-than-significant levels, mitigation measures MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would be implemented. Mitigation measure MM BI-12a.1 would reduce the effects of construction-related activities to EFH by establishing a construction window that would minimize impacts to fish by avoiding migration and breeding periods. Mitigation measure MM BI-12a.2 would ensure that personnel involved in deconstruction activities are trained on measures to avoid and minimize adverse effects to special-status aquatic species and their habitats. Mitigation measure MM BI-12b.1 would avoid areas with submerged vegetation thereby protecting habitat and manage construction equipment with Best Management Practices to prevent contamination. Mitigation measure MM BI-12b.2 would mandate the creation and implementation of a Seafloor Debris Removal Plan. This Plan shall include sufficient environmental protection measures to ensure effective recovery of lost Project debris and minimize potential environmental impacts posed by the debris, or debris recovery to designated EFH or other sensitive Bay habitats and biota (i.e., critical habitat and herring spawning habitats). Implementation of these mitigation measures would reduce potential adverse effects on EFH in Yosemite Slough to less-than-significant levels.

Impact BI-13: Wildlife Movement

Impact of Candlestick Point

Impact BI-13a **Construction at Candlestick Point would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites. (Less than Significant)** ***[Criterion N.d]***

As discussed in the Setting section, surveys of Candlestick Point and review of background studies did not identify any regional wildlife corridor or migratory pathways. The site is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide

substantial movement corridors or migratory pathways occur within Candlestick Point. No areas that would be considered nursery sites, which generally include some types of wetlands and avian rookeries, are found within Candlestick Point. The area surrounding Candlestick Point is part of the San Francisco Bay estuary, and the areas of the estuary affected by the Candlestick Point portion of the Project would be the existing shoreline structures. These structures would be replaced with new similar structures that would be designed to provide even higher-quality habitat for wildlife, including estuarine species, than the existing shoreline. In addition, although migratory fish could move though the open water and tidal portion of the site, Candlestick Point does not contain any migratory fish pathways such as anadromous fish streams or rivers (fish that breed in freshwater and spend adult lives in the ocean) and Project construction would not fragment habitat or create substantial barriers to movement though the adjacent waters. Consequently, construction at Candlestick Point would affect primarily terrestrial species well adapted to human disturbance that move locally within the Project site and the adjacent habitat patches. These common ground-dwelling vertebrates forage for food, mate, and move between habitat patches within the site and typically have small ranges that would limit their movement to localized use. Construction at Candlestick Point would not substantially interfere with this local movement as the wildlife would be able to continue their pre-Project activities in the areas not under construction, and construction would not permanently bar their movement through those portions of the site. Consequently, as the Project would not interfere substantially with the movement of native resident or migratory wildlife species, established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites, impacts would be less than significant. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-13b **Construction at HPS Phase II and construction of the Yosemite Slough bridge would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, but it could impede the use of native wildlife nursery sites. (Less than Significant with Mitigation) *[Criterion N.d]***

As discussed in the Setting section, surveys of HPS Phase II did not identify any regional wildlife corridor or migratory pathways. The site is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways occur within HPS Phase II. Consequently, construction at HPS Phase II would affect primarily terrestrial species that are well adapted to human disturbance in the area and move locally within the Project site and between the adjacent habitat patches. These common ground-dwelling vertebrates forage for food, mate, and move between habitat patches within the site and typically have small ranges that would limit their movement to localized use. Construction of HPS Phase II would not substantially interfere with this local movement as the terrestrial wildlife would be able to continue their pre-Project activities in the areas not under construction, and construction would not permanently bar their movement through those portions of the site as the construction activities would be temporary.

The Yosemite Slough bridge would separate the upper part of Yosemite Slough, including the proposed restoration site, from South Basin and San Francisco Bay. This structure would not, however, substantially reduce the ability of fish or wildlife that currently move in and out of Yosemite Slough to continue doing so. The bridge's low, flat profile would allow birds to easily fly over the bridge between the upper part of

the slough and South Basin, but the bottom of the bridge deck is high enough to allow swimming birds such as ducks to swim under the bridge when tidal conditions would currently permit such movements. The bridge's piers would occupy only a very small fraction of the aquatic habitat within the bridge footprint, and thus fish and other aquatic species would be able to easily move in and out of the slough even after the bridge is constructed. Although the bridge and the road crossing it would impede movement of terrestrial species from one side of the bridge to the other, sufficient terrestrial space would be present above the high tide line at the abutments to allow terrestrial wildlife to pass under the bridge. Consequently, Project activities within HPS Phase II and Yosemite Slough would not substantially interfere with the movement of any native resident or migratory terrestrial species.

With respect to aquatic species, although migratory fish could move through the open water and the Yosemite Slough, HPS Phase II does not contain any substantial migratory fish pathways such as anadromous fish (fish that breed in freshwater and spend adult lives in the ocean) streams or rivers and Project construction, including the Yosemite Slough bridge, would not further fragment habitat or create substantial barriers to movement though the adjacent waters such to prevent aquatic species from moving freely along the coastline. However, as discussed in Impact BI-5b, construction of HPS Phase II components such as breakwaters and other shoreline treatments would occur near eelgrass beds, which could remove them or indirectly impact them such that productivity and survival of these habitats would be reduced. Eelgrass communities are considered important aquatic nursery sites as they serve as a haven for numerous aquatic species. Elimination of these important nursery areas would be a significant impact, as it would substantially impede the use of the only two patches of eelgrass habitat (wildlife nursery sites) in the HPS Phase II site. To reduce these impacts, mitigation measures MM BI-5b.1 through MM BI-5b.4 would be implemented.

Implementation of mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects of HPS Phase II construction on eelgrass by avoiding impacts through initial design if feasible; determining the locations of eelgrass beds through surveys; using survey data to refine shoreline treatments to further avoid or minimize impacts to eelgrass; and compensating for unavoidable impacts through the creation or restoration of eelgrass beds at a 3:1 ratio. Consequently, implementation of these measures would reduce impacts to eelgrass beds, and thus to nursery sites, to less-than-significant levels. This would ensure that construction of HPS Phase II would not interfere substantially with the use of native wildlife nursery sites. Implementation of these mitigation measures would reduce this impact to a less-than-significant level.

Impact BI-14: Local Plans and Policies

Impact of Candlestick Point

Impact BI-14a **Construction at Candlestick Point would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant with Mitigation) *[Criterion N.e]***

The *City of San Francisco General Plan* articulates broad policies to protect natural resources and federally and state listed species, and work with federal and state agencies. The General Plan does not identify any additional, specific resources for protection beyond those identified by federal and state agencies. This document analyzes the impacts of the project on natural resources identified for protection by such federal and state policies, and identifies mitigation measures to reduce or avoid significant impacts. The Project would not, therefore, conflict with the natural resource protection policies of the General Plan.

In addition, the City has adopted an Urban Forestry Ordinance to protect street trees within the jurisdiction of the DPW, and significant and landmark trees within the jurisdiction of the DPW or on private property. Section 143 of the City's Planning Code requires the planting of street trees when constructing new buildings within specified land use districts. According to the City's registry of "landmark trees", no such trees are present on Candlestick Point or elsewhere in the Project area.[832] A tree survey[833] was conducted within all of the Project site except the portion of CPSRA that is not subject to the land transfer and is thus not subject to direct impacts from this Project. This survey identified approximately 1,976 "tree"[834] stems emanating from 1,068 individual plants on Candlestick Point. Of these, approximately 1,079 stems meet the size criteria for "significant trees", as defined by the Urban Forestry Ordinance, and any of these trees that is (1) on property under the jurisdiction of the Department of Public Works or (2) on privately owned-property with any portion of its trunk within 10 feet of the public right-of-way would be considered a significant tree. Likewise, any of the 1,976 trees on Candlestick Point growing within the public right-of-way or on land under the jurisdiction of the Department of Public Works would be considered a "street tree"; some trees meet the criteria of both significant trees and street trees. The vast majority of these trees consisted of multiple-stemmed myoporum; eucalyptus, pines, and olives were also well represented. All four of these species are non-natives.

Construction activities associated with Candlestick Point could result in disturbance or loss of trees within DPW jurisdiction. These trees would be subject to the requirements of the *Public Works Code*, which specifies a process for gaining approval to remove trees, and requires the protection of trees during construction activities. Trees approved for removal must be replaced in accordance with DPW requirements. Compliance with the City's Street Tree Ordinance will reduce impacts to trees within DPW jurisdiction to a less-than-significant level.

The removal of trees located outside of DPW jurisdiction is not subject to regulation by the *Public Works Code*. However, the removal of large numbers of trees, particularly trees that meet the size definition of significant trees, without replacement of trees, could result in conflicts with policies articulated in the City's Urban Forestry Ordinance. The ordinance identifies trees as important to the urban environment because they improve air quality and wildlife habitat, contribute to psychological well-being and the aesthetic environment, and decrease noise. The City's *Planning Code* Section 143 embodies similar policies by requiring the planting of certain quantities of street trees when constructing new development in certain areas of the City. The *Planning Code* does not automatically apply in redevelopment areas, so the development that does not include planting of street trees would conflict with the policy goals of Section 143. Mitigation measure MM BI-14a would ensure that development in Candlestick Point does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143.

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832 http://www.sfenvironment.org/our_programs/interests.html?ssi=4&ti=8&ii=131.
833 H.T. Harvey & Associates, *Candlestick Point/Hunters Point Shipyard Tree Survey*. October 16, 2009.
834 For the purpose of this survey, any stem of a woody plant with a tree-like (as opposed to shrubby) growth habit measuring at least 2 inches in diameter at a height of 4.5 feet above the ground was considered a "tree."

MM BI-14a *Preservation and Replacement of Significant Trees, and Preservation and Planting of Street Trees. Construction activities outside of the Department of Public Works (DPW) jurisdiction could result in the disturbance or removal of a large number of trees. To minimize this impact, the following measures shall be implemented by the Project Applicant in these areas:*

1. *Avoidance of the removal of trees that meet the size specifications of significant trees in the Public Works Code Article 16 shall occur to the maximum extent feasible, and any such trees that are removed shall be replaced at a minimum of 1:1 (1 impacted:1 replaced). The species used for replacement shall be consistent with DPW recommendations.*
2. *Street trees shall be planted in all new development areas. The species, size, and locations shall be consistent with the requirements specified in Planning Code Section 143, including, but not limited to, the following:*
    a) *The street trees installed shall be a minimum of one 24-inch box tree for each 20 feet of frontage of the property along each street or alley, with any remaining fraction of 10 feet or more of frontage requiring an additional tree. Such trees shall be located either within a setback area on the lot or within the public right-of-way along such lot.*
    b) *The species of trees selected shall be suitable for the site, and, in the case of trees installed in the public right-of-way, the species and locations shall be subject to the approval by the DPW. Procedures and other requirements for the installation, maintenance, and protection of trees in the public right-of-way shall be as set forth in* Public Works Code *Article 16.*
3. *If a significant tree or street tree will not be removed, but construction activities will occur within the dripline of such trees, a Tree Protection Plan shall be prepared by an International Society of Arboriculture (ISA) certified arborist, in accordance with the Urban Forestry Ordinance. This plan shall be submitted to the Planning Department for review and approval prior to issuance of a demolition or building permit. The Tree Protection Plan shall include measures to protect all parts of a tree from disturbance during construction, and may include the following:*
    a) *A site plan with tree species, trunk location, trunk diameter at breast height, and the canopy dripline area within development*
    b) *The use of protective fencing to establish an area to be left undisturbed during construction*
    c) *Protection specifications, including construction specifications such as boring instead of trenching for utility lines, or tree specifications such as drainage, fertilization, or irrigation measures*
    d) *Pruning specifications, if needed, to preserve the health of the tree and allow construction to proceed*

Mitigation measure MM BI-14a would encourage the preservation of street trees and trees that are large enough to meet the size specification of significant trees in the *Public Works Code*, and would require the replacement of large trees that are removed. Further, it would require the planting of street trees consistent with the intent of the *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. The planting of an estimated 10,000 net new trees would increase the number of trees in the Study Area considerably, increase canopy cover, and promote a healthy and sustainable urban forest. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Project would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees. Impacts would be less than significant.

Further, the Draft Parks, Open Space, and Habitat Concept Plan (as required by mitigation measure MM BI-7b) includes the planting of approximately 10,000 net new trees, avoids removal of native trees

where feasible, and establishes new parkland and open space that would include a predominance of native species (see Impact BI-2 and Impact BI-7b). The planting of an estimated 10,000 net new trees at the Project site and in the community would increase the number of trees in the Study Area considerably, increase canopy cover, and promote a healthy and sustainable urban forest. Consequently, development of Candlestick Point would not conflict with any local policies or ordinances protecting biological resources, and overall impacts would be beneficial.

Impact of Hunters Point Shipyard Phase II

Impact BI-14b **Construction at HPS Phase II and Yosemite Slough bridge would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant with Mitigation) *[Criterion N.e]***

Similar to development at Candlestick Point, construction activities associated with HPS Phase II would be consistent with the policies of the *City of San Francisco General Plan* relating to biological resources. In addition, the City has adopted an Urban Forestry Ordinance to protect street trees within the jurisdiction of the DPW, and significant and landmark trees within the jurisdiction of the DPW or on private property. Section 143 of the City's Planning Code also regulates the planting of street trees associated with construction of buildings within specified land use districts. According to the City's registry of "landmark trees", no such trees are present on HPS Phase II or elsewhere in the Project area.[835] A tree survey[836] conducted for the Project identified approximately 854 "tree" stems emanating from 328 individual plants on HPS Phase II. Of these, approximately 400 stems meet the size criteria for "significant trees", as defined by the Urban Forestry Ordinance. Although most of HPS Phase II is within the jurisdiction of the Navy, if and any of these trees are (1) on property under the jurisdiction of the Department of Public Works or (2) on privately owned-property with any portion of its trunk within 10 feet of the public right-of-way, it would be considered a significant tree under the Urban Forestry Ordinance. Likewise, any of the 854 trees on HPS Phase II growing within the public right-of-way or on land under the jurisdiction of the Department of Public Works would be considered a "street tree"; some trees meet the criteria of both significant trees and street trees. Trees recorded on HPS Phase II during the tree survey were dominated by small, multi-stemmed toyon (*Heteromeles arbutifolia*; a native species, though the trees on HPS appear to be of an ornamental variety) and several non-natives, including London planetree (*Platanus* x *acerifolia*) and acacia (*Acacia* spp.).

Construction activities associated with HPS Phase II could result in disturbance or loss of trees within DPW jurisdiction, including areas outside of the Navy's property (i.e., City streets adjoining the HPS Phase II areas) or within on-site and off-site areas of Yosemite Slough (i.e., where construction of infrastructure may occur). These trees would be subject to the requirements of the *Public Works Code*, which specifies a process for gaining approval to remove trees, and requires the protection of trees during construction activities. Trees approved for removal must be replaced in accordance with DPW requirements. Compliance with the City's Street Tree Ordinance will reduce impacts to trees within DPW jurisdiction to a less-than-significant level.

[835] http://www.sfenvironment.org/our_programs/interests.html?ssi=4&ti=8&ii=131.
[836] H.T. Harvey & Associates, *Candlestick Point/Hunters Point Shipyard Tree Survey*. October 16, 2009.

The removal of trees located outside of DPW jurisdiction is not subject to regulation by the *Public Works Code*. However, the removal of large numbers of trees, particularly trees that meet the size definition of significant trees, without replacement of trees, could result in conflicts with policies articulated in the City's Urban Forestry Ordinance. The ordinance identifies trees as important to the urban environment because they improve air quality and wildlife habitat, contribute to psychological well-being and the aesthetic environment, and decrease noise. The City's *Planning Code* Section 143 embodies similar policies by requiring the planting of certain quantities of street trees when constructing new development in certain areas of the City. The *Planning Code* does not automatically apply in redevelopment areas, so the development that does not include planting of street trees would conflict with the policy goals of Section 143. Mitigation measure MM BI-14a would ensure that development in HPS Phase II does not result in conflicts with these policies by requiring preservation of street trees and trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. Therefore, with implementation of mitigation measure MM BI-14a, impacts would be less than significant.

Further, the Draft Parks, Open Space, and Habitat Concept Plan (required by mitigation measure MM BI-7b) includes the planting of approximately 10,000 net new trees at the Project site and in the community, avoids removal of native trees where feasible, and establishes new parkland and open space that would include a predominance of native species (refer to Impact BI-2 and Impact BI-7b). The planting of an estimated 10,000 net new trees would increase the number of trees in the Study Area, increase canopy cover, and promote a healthy and sustainable urban forest. Consequently, development of HPS Phase II and construction of the Yosemite Slough bridge would not conflict with any local policies or ordinances protecting biological resources, and overall impacts would be beneficial.

Impact BI-15: Contaminated Soils or Sediments during Construction

Impact of Candlestick Point

Impact BI-15a **Construction within the shoreline or Bay at Candlestick Point would not result in the disturbance of contaminated soil or the re-suspension of contaminated sediments. (No Impact) *[Criteria N.a and N.b]***

There are no sites with known contamination requiring remediation at Candlestick Point. Therefore, fish or wildlife species, and aquatic communities would not be exposed to contaminated fill or Bay/shoreline sediments during construction activities, and there would be no impact. No mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-15b **Construction within the shoreline or Bay at HPS Phase II would not result in the disturbance of contaminated soil or the re-suspension of contaminated sediments. (Less than Significant with Mitigation) *[Criteria N.a and N.b]***

As discussed in Section III.K (Hazards and Hazardous Materials) of this EIR, chemicals and radioactive materials are present in soil and groundwater in various locations throughout the HPS Phase II site at levels that require remediation. Disturbance of fill or shoreline sediments, and associated stockpiling and on-site soil movement, during construction could provide potential pathways through which fish and wildlife

species could be exposed to contaminants in fill material or Bay/shoreline sediments. Exposure of fish and wildlife to such contaminants could potentially impair the health or productivity of exposed individuals, or could have food-chain effects on species that prey upon exposed individuals through bioconcentration of contaminants. Contaminant exposure that adversely affects the health or productivity of special-status fish or wildlife species, or that adversely affects large numbers of individuals of common fish and wildlife species, would be considered a substantial adverse effect.

As discussed in Section III.K, the Navy is responsible for some remediation activities (i.e., radiological contamination) on HPS Phase II. Because contaminants have been identified in those parcels for which remedial actions have been selected but not yet implemented by the Navy, construction of shoreline improvements has the potential to disturb sediment or soil that may contain chemical contaminants. However, if the Navy does not complete its remediation activities in advance of Project activities, the San Francisco Redevelopment Agency (Agency) or the Project Applicant would implement the remaining remediation activities in conjunction with shoreline improvement activities, with appropriate regulatory oversight, as required by mitigation measure MM HZ-10b. Impact HZ-10b discusses the process that would be followed by Agency or the Project Applicant in conjunction with development activities with appropriate regulatory oversight to manage potentially contaminated sediments that could be affected by Project shoreline improvements.

In addition, as discussed in Section III.M (Hydrology and Water Quality) of this EIR, implementation of measures to control stormwater runoff during construction would control discharge of potential chemicals adhered to soil in the runoff. Mitigation measures MM HY-1a.1 and MM HY-1a.2 would require preparation of a SWPPP to identify the specific measures and BMPs that are applicable to HPS Phase II construction activities in the event of a spill of construction materials or exposure of hazardous materials. This would reduce the likelihood of contaminants being conveyed to near-shore and offshore environments, which would reduce the risk to the aquatic environment and species that rely on that habitat (e.g., birds and mammals).

Implementation of mitigation measures MM HZ-10b, MM HY-1a.1, and MM HY-1a.2 would reduce the exposure of fish or wildlife to contaminated fill or Bay/shoreline sediments during construction activities, and adverse effects would be less than significant.

Operational Impacts

Impact BI-16: Sensitive Birds and Marine Mammals

Impact of Candlestick Point

Impact BI-16a **Implementation of the Project at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS or interfere substantially with the movement of any native resident or migratory fish, or impede the use of native wildlife nursery sites. (Less than Significant)** ***[Criteria N.a and N.d.]***

Operation of the development at Candlestick Point does not contain an in-water operational component and would not impact birds or marine mammals within the waters of the Bay. There are no known marine mammal pupping sites or major haulout locations within Candlestick Point where animals would be subject to increased disturbance during operation. Consequently, operation of Project components at Candlestick Point would not have a substantial adverse effect on these sensitive aquatic resources.

Human activity at Candlestick Point following completion of construction would affect wildlife, including invertebrates, reptiles, amphibians, birds, and mammals. Potential adverse effects include disturbance of individuals (including nesting birds) in terrestrial, shoreline, and aquatic habitats due to movement by humans, domestic animals, and vehicles; depredation of native species by domestic animals; injury or mortality of individuals due to vehicular traffic; and other impacts. In addition, an increase in trash, particularly food waste, could potentially subsidize nuisance species, which in turn could increase predation on more sensitive wildlife species. However, as discussed in Impact BI-2, adverse effects of human disturbance and other operational factors would occur primarily to small numbers of regionally abundant species, and operational impacts would not substantially affect populations of these species. Impacts would be less than significant, and no mitigation is required.

Furthermore, for many of these common species, adverse effects of human disturbance on local (i.e., Project-wide) numbers would be offset by the benefits of habitat improvements incorporated into the Project's Draft Parks, Open Space, and Habitat Concept Plan (required by mitigation measure MM BI-7b). Thus, operational activities at Candlestick Point would benefit terrestrial biological resources.

Impact of Hunters Point Shipyard Phase II

Impact BI-16b **Implementation of the Project at HPS Phase II, including operation of the proposed marina, would not have a substantial adverse effect, either directly or through habitat modifications, on aquatic species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS or interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant) *[Criteria N.a and N.d.]***

Operation of the marina and marina-related activities (personal watercraft operations) would have the potential to disturb marine mammals and birds. The marine mammals most likely to be disturbed are locally foraging harbor seals. There are no known pupping sites or major haulout locations where animals would be subject to increased disturbance from vessel traffic from the Project. San Francisco Bay provides resting and foraging habitat for a variety of waterfowl migrating along the Pacific flyway. These birds often congregate into relatively large rafts of birds. Those rafts are subject to the disturbance from noise, size, speed, and wakes generated by vessel traffic. The common response to disturbance is for the birds to fly off the water surface and fly some distance away and land. Both the marina and marina-related (personal watercraft operations) activities would increase the disturbance to birds resting and foraging on Bay waters. However, out of a 300-slip marina, only a small percentage of the boats docked there are expected to be in use at any one time. Considering the size of the Bay, the number of boats currently on the bay at any one time, and the amount of disturbance currently generated by the existing boats on the Bay, the few

boats that at any one time are moving from the proposed marina into the Bay are not expected to generate substantial additional disturbance over current conditions. Consequently, they would not have substantial adverse effects on migrating or resting waterfowl.

Piers 1, 2, and 3 at the south side of HPS Phase II would be separated from the shore, but would remain in place. Those piers could provide resting, and potentially nesting, habitat for gulls, terns, and other marine-oriented species. Recreational use of the area would be limited to fishing from boats; however, the water is relatively shallow and not likely to support substantial populations of sportfish such that large amounts of angler (recreational fishermen) disturbance would be generated at any one time. Also, the existing piers are well above the water surface, separating resting birds from direct interaction with anglers. Therefore, recreational boating or fishing in this area would not be expected to substantially affect birds using or traveling to and from those piers. For these reasons, the operation of the marina and marina-related activities the marina would not have a substantial adverse effect on marine mammals and resting waterfowl.

Human activity at HPS Phase II following completion of construction would affect wildlife, including invertebrates, reptiles, amphibians, birds, and mammals, as described above for Candlestick Point. However, adverse effects of human disturbance and other operational factors would not substantially affect populations of these species. Impacts would be less than significant, and no mitigation is required.

Furthermore, for many of these common species, adverse effects of human disturbance on local (i.e., Project-wide) numbers would be offset by the benefits of habitat improvements incorporated into the Project's Draft Parks, Open Space, and Habitat Concept Plan (required by mitigation measure MM BI-7b). Thus, operational activities on HPS Phase II would benefit terrestrial biological resources.

Impact BI-17: Nesting American Peregrine Falcons

Impact of Candlestick Point

Impact BI-17a **Implementation of the Project at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on nesting American peregrine falcons, identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (No Impact) *[Criterion N.a]***

No American peregrine falcons nests are found within Candlestick Point. No impact would occur, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-17b **Implementation of the Project at HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on nesting American peregrine falcons, identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. (No Impact) *[Criterion N.a]***

As previously discussed under Impact BI-6b, a resident pair of American peregrine falcons has been observed successfully nesting on the Re-gunning crane on Parcel D of HPS Phase II. The Project's operations would not result in substantial adverse effects to the falcons' nesting activities as the nesting

pair currently present has persisted, and nested successfully, at this site for several years even while remediation activities have been ongoing in the vicinity of the nest site. Many pairs of this species nest in high disturbance and heavily illuminated locations such as the towers in downtown San Francisco (i.e., the Pacific Gas and Electric Company's Headquarters) and the Bay Bridge (adjacent to construction activities). Operation activities of the Project would not result in substantial adverse effects on nesting American peregrine falcons. No impact would occur, and no mitigation is required.

Impact BI-18: Sensitive Aquatic Species, Mollusks, and Designated EFH

Impact of Candlestick Point

Impact BI-18a **Implementation of the Project at Candlestick Point would not have a substantial adverse effect, either directly or through habitat modifications, on aquatic species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the CDFG or USFWS, or have a substantial adverse effect on designated EFH, a sensitive natural community identified in local or regional plans, policies, and regulations or by the NMFS. (No Impact)** ***[Criteria N.a and N.b]***

Operational activities within Candlestick Point do not contain an in-water operational component and would not generate increases in turbidity or other impacts that could adversely affect species identified as a candidate, sensitive, or special-status, or designated EFH. Rather, the shoreline improvements would reduce erosion relative to existing conditions, thus reducing the potential for any re-suspension of sediments. No impact would occur, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-18b **Implementation of the marina in HPS Phase II would require routine maintenance dredging of the marina, which could remove habitat or generate substantial increases in turbidity within the marina, but would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the CDFG or USFWS, or have a substantial adverse effect on designated EFH, a sensitive natural community identified in local or regional plans, policies, and regulations or by the NMFS. (Less than Significant with Mitigation)** ***[Criteria N.a and N.b]***

Routine dredging of the marina could be required to maintain operational depth over the life of the Project. Dredging of marinas typically involves a clamshell excavator, which is used to physically remove sediments that are then transported off site for disposal. This method of sediment removal results in massive suspension of Bay mud. Those particles eventually settle out onto the seafloor and surrounding substrates. Up to several inches of new sediment deposition is possible. This would result in Project effects on sensitive species and EFH through two avenues.

The first is alteration of or removal of habitat, which occurs when this sediment settles out onto native oysters or spawning substrate for herring (there is no known eelgrass within the marina location). Oysters require hard substrates to attach to and are unable to move above layers of sediment as they are deposited.

Oysters are likely found on most hard substrates within the area and would settle onto the new breakwaters, piers, and floating dock system. Increased rates of sediment accumulation could decrease their survival. Pacific herring attach their eggs to had substrates and aquatic vegetation (docks, pilings, piers, eelgrass, etc). Sediment accumulation that would affect herring would only occur on relatively flat substrates (i.e., riprap). Because herring can spawn on vertical substrates (i.e., piers or breakwaters) and they can actively choose spawning habitats, the deposition of sediment within the marina would not result in a substantial reduction in available habitat.

The second avenue of potential impact could occur if the sediment plume disrupts behavior of fish managed under EFH regulations. These disturbances are expected to be temporary because fish can swim away from the plume and dredging operations. Because of this, maintenance dredging of the marina would have only a temporary impact on these species, and this is considered a less-than-significant impact. Pacific herring could spawn within the marina, but all dredging windows for the Bay do not allow dredging to occur during the spawning season, and, therefore, dredging would not impact spawning herring resource.

Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina maintenance dredging to less-than-significant levels by requiring compensatory mitigation for impacts to oysters and EFH that would be designed to avoid, minimize, and if avoidance is not feasible, restore oyster habitat and EFH. Mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities. Consequently, implementation of both measures would reduce adverse effects of sedimentation associated with dredging to less-than-significant levels.

MM BI-18b.1 *Maintenance Dredging and Turbidity Minimization Measures for the Operation of the Marina. Maintenance dredging for the marina could remove or generate sediment plumes that could impact special-status species, their habitats, and Essential Fish Habitat (EFH). To minimize this effect, the following measures shall be implemented by the Project Applicant:*

1. *Conduct a detailed survey for native oysters in all suitable substrates within the marina, which includes the area between the land and breakwaters, after construction of the new breakwaters. This survey shall be conducted by a qualified oyster biologist at low tides that expose the maximum amount of substrate possible. Surveys can be conducted at any time of year, but late summer and early fall are optimal because newly settled oysters are detectable. This survey shall occur before any construction within the proposed marina location takes place to establish a baseline condition. If few or no oysters are observed on hard substrates that would remain in place after dredging, no further mitigation is required.*
2. *If oysters are found at densities at or above 90 oysters per square meter[837] on suitable oyster-settlement substrates that would be removed or in areas where dredging sediment could settle out onto the oysters, a detailed sediment plume modeling study of the proposed marina operation shall be conducted to determine if the operations and maintenance of the marina would generate a substantial plume of sediment. This model shall include the local bathymetry and sediment information, tidal data, and detailed marina information (number and types of boats, etc). The model shall be prepared by a qualified harbor engineer (as approved by the City/Agency) with direct experience in this type of work within San Francisco Bay, prior to issuance of any permits for the construction of features directly associated with the marina. A report documenting modeling*

[837] MACTEC Engineering and Consulting, Inc. 2008. *Oyster Point Marina Olympia Oyster Surveys Pre- and Post-Dredging February 2008, Oyster Point Marina, South San Francisco, California*. Prepared for PBS&J; Obernolte. 2009. Personal communication between MACTEC and PBS&J.

methods, input data, assumptions, results, and implications for increased rates of sedimentation shall be prepared and provided to NMFS during the USACE-directed Section 7 and EFH consultation for the marina. If the model demonstrates minimal sediment resuspension that would settle out before reaching sensitive habitats, no further mitigation is required.

3. *If the sediment plume reaches sensitive shoreline habitats (substrates that support native oysters), compensatory mitigation shall be provided by the Project Applicant at a ratio recommended by NMFS for the type of habitat adversely affected. The Project Applicant shall retain a qualified oyster biologist (as approved by the City/Agency) to develop an Oyster Restoration Plan that shall be reviewed and approved by the City/Agency. This Plan shall include site selection, substrate installation, and monitoring procedures, and include the following components (unless otherwise modified by NMFS):*

   > *A suitable site for installation of replacement substrate would be one with adequate daily tidal flow, a location that would not be affected by maintenance dredging or other routine marina maintenance activities, and one that is lacking in appropriate settlement substrate. A location outside of the new breakwaters or in association with any eelgrass mitigation sites would be appropriate.*

   > *Although oysters would settle on a variety of materials, the most appropriate for restoration purposes is oyster shell. This is typically installed by placing the shell into mesh bags that can then be placed in piles on the seafloor of the mitigation site. Enough shell shall be installed under the guidance of a qualified oyster biologist to make up for the loss attributable to the Project. Mitigation shall occur after construction of all in-water elements of the Project within HPS Phase II.*

   > *The restoration site shall be monitored on a regular basis by a qualified oyster biologist for a minimum of two years, or until success criteria are achieved if they are not achieved within two years. Monitoring shall involve routine checks (bi-monthly during the winter and monthly during the spring and summer) to evaluate settlement, growth, and survival on the mitigation site. Success shall be determined to have been achieved when settlement and survival rates for oysters are not statistically significantly different between the mitigation site and either populations being impacted (if data are available) or nearby established populations (i.e., Oyster Point Marina).*

MM BI-18b.2 *Implement BMPs to Reduce Impacts of Dredging To Water Quality. BMPs established in Appendix I of the Long-Term Management Strategy (LTMS) for management of disposal of dredge material in San Francisco Bay are designed specifically to minimize spread of contaminants Long-Term Management Strategy (LTMS) outside of dredge areas. All of these elements of the LTMS shall be applied to any proposed dredging or construction activities associated with the Project unless otherwise modified by the USACE, BCDC, or SFRWQCB in permit conditions associated with the proposed dredging activities associated with this Project (same as MM BI-19b.2).*

Impact BI-19: Contaminated Sediments during Operation

Impact of Candlestick Point

Impact BI-19a **Implementation of the Project at Candlestick Point would not result in impacts to aquatic organisms through the re-suspension of contaminated sediments. (No Impact) *[Criteria N.a and N.b]***

Operational activities within Candlestick Point do not contain an in-water operational component and would not result in the re-suspension of contaminated sediments that could have health consequences for

sensitive fish species and degrade EFH. Rather, the shoreline improvements would reduce erosion relative to existing conditions, thus reducing the potential for any re-suspension of contaminants. No impact would occur, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact BI-19b **Implementation of the marina in HPS Phase II would not have a substantial adverse effect, either directly or through habitat modifications, on sensitive aquatic species, identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS, or have a substantial adverse effect on designated EFH, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS, or have a substantial effect on predators that prey on contaminated species or feed on contaminated substrates as a result of routine maintenance dredging or could generate routine increases in turbidity within the marina that would result in the re-suspension of contaminated sediments. (Less than Significant with Mitigation) *[Criteria N.a and N.b]***

Much of the seafloor within the Study Area is contaminated from decades of industrial use.[838] The primary contaminants are metals such as copper, lead, mercury, and polychlorinated biphenyl (PCBs), concentrations of which diminish with distance from the shoreline.[839] Routine dredging activities required to maintain operational depth of the marina could result in the suspension of contaminated sediments from the seafloor. Contaminants in these sediments may be taken up by aquatic organisms, either within the marina or in other areas to which contaminated sediments are carried by tides or currents. The uptake of contaminated food sources or exposure to elevated levels of toxins can reduce reproductive success, alter blood chemistry, suppress a fish's immune systems, and result in an increased risk of disease and mortality.[840,841] These effects may occur in aquatic organisms that take up contaminated substances directly, wildlife species (such as shorebirds) that forage in contaminated substrates, or predators that feed on prey that have taken up contaminants. Such impacts are potentially significant.

To reduce these impacts to less-than-significant levels, the following mitigation measures would be implemented.

MM BI-19b.1 *Work Windows to Reduce Maintenance Dredging Impacts to Fish during Operation of the Marina. According to the Long-Term Management Strategy (LTMS), dredging Projects that occur during the designated work windows do not need to consult with NMFS under the federal* Endangered Species

838 Barajas and Associates, Inc. 2008. Final Feasibility Study Report for Parcel F, Hunters Point Shipyard, San Francisco, California. Prepared for Base Realignment and Closure Program Management Office West.
839 Barajas and Associates, Inc. 2008. Final Feasibility Study Report for Parcel F, Hunters Point Shipyard, San Francisco, California. Prepared for Base Realignment and Closure Program Management Office West.
840 Jacobson, K.C., M.R. Arkoosh, A.N. Kagley, E.R. Clemons, and T.K. Collier, 2003. Cumulative Effects of Natural and Anthropogenic Stress on Immune Function and Disease Resistance in Juvenile Chinook Salmon, *Journal of Aquatic Animal Health*, 15: 1-12.
841 Landhal, J.T., L.L. Johnson, J.E. Stein, T.K. Collier, and U. Varanasi, 1997. Approaches for determining affects of pollution on fish populations in Puget Sound. *Transactions of the American Fisheries Society* 126: 519-535.

Act *(FESA).*[842] *The window in which dredging is allowed for the protection of steelhead in the central Bay is June 1 to November 30. The spawning season for the Pacific herring is March 1 to November 30.*[843] *Therefore, the window that shall be applied to minimize impacts to sensitive fish species is December 1 to February 28, upon consultation with NMFS.*

MM BI-19b.2 *Implement BMPs to Reduce Impacts of Dredging To Water Quality. BMPs established in Appendix I of the Long-Term Management Strategy (LTMS) are designed specifically to minimize spread of contaminants outside of dredge areas. All of these elements of the LTMS shall be applied to any proposed dredging or construction activities associated with the Project unless otherwise modified by the USACE, BCDC, or the San Francisco Bay Regional Water Quality Control Board in permit conditions associated with the proposed dredging activities associated with this Project (same as MM BI-18b.2).*

Implementation of mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce contamination associated with dredging to less-than-significant levels by (1) reducing the effects of increased contamination resulting from routine maintenance dredging by requiring that dredging occur during established work windows when sensitive fish species are less likely to be present, and (2) mandating application of BMPs to control the distribution of sediments disturbed by the dredging activities. Consequently, implementation of these mitigation measures would reduce potential adverse effects to less-than-significant levels.

Impact BI-20: Wildlife Movement

Impact of Candlestick Point

Impact BI-20a **Implementation of the Project at Candlestick Point would not interfere substantially with the movement of resident or migratory bird species by increasing collision hazards and the amount of artificial lighting. (Less than Significant with Mitigation) *[Criterion N.d]***

The Project would be located along the Pacific Flyway for migratory birds. Migrating birds, such as songbirds, can be affected by human-built structures because of their propensity to migrate at night, their low flight altitudes, and their tendency to be disoriented by artificial light, making them vulnerable to collision with obstructions.[844] In addition, birds migrating at night are strongly attracted to sources of artificial light, particularly during periods of inclement weather.[845] Exposure to a light field at night can cause alteration of a straight flight path, and the change in flight path would keep the bird near the light source longer than if the flight path remained straight.[846] Brightly lit buildings can confuse migrating birds, trapping them in the bright light, which they are reluctant to fly out of, until they are exhausted or collide

[842] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001.
[843] US Army Corps of Engineers, US Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board. Long-term Management Strategy for the Placement of Dredge Material in the San Francisco Bay, Management Plan 2001; Appendix F.
[844] Gauthreaux, S.A. Jr. and C. Belser., Ecological Consequences of Artificial Night Lighting: Effects of Artificial Night Lighting on Migrating Birds, Island Press, Washington, 2006.
[845] Ibid.
[846] Ibid.

with a building.[847] Confused by artificial lights, blinded by the weather, and unable to see glass, large numbers of birds have been documented being injured or killed by colliding with buildings in eastern and midwestern North America.[848] Summaries of documented mortality from bird collisions have almost invariably focused on mortality in those regions, however, and large-scale mortality at buildings on the West Coast has not been reported.[849,850]

At Candlestick Point, residential towers would range from 200 to 420 feet in height and the majority of local bird movement would be expected to be along the shoreline of San Francisco Bay, especially for shorebirds, as they move from foraging habitat to perching or roosting habitats in response to changes in the tide. Because the existing structures are relatively low (i.e., Candlestick Park stadium), the risk of bird strikes under existing conditions is expected to be minimal. New buildings from 200 to 420 feet in height would constitute a substantial increase in obstacles within flight paths when compared to existing conditions. The Project would create bird strike hazards at elevations that do not currently exist. With structures 400 feet tall or taller and windy, often foggy conditions found along San Francisco Bay, the risk of collision for birds would increase. Therefore, the Project could result in the creation of a new strike hazard for migrating birds that could result in loss of substantial numbers of birds over the life of the Project. Additionally, operating effects associated with the lighting of the towers can alter the flight patterns of migratory birds and potentially increase bird strike collisions with the tall buildings.

Although large-scale injury or mortality of birds due to collisions with buildings has not been reported from the West Coast, there is some potential for such mortality to occur in the absence of mitigation measures. Because of these potential effects, the Project is considered to have a potentially significant impact to migratory birds.

To reduce these impacts the following mitigation measures would be implemented.

MM BI-20a.1 *Lighting Measures to Reduce Impacts to Birds. During design of any building greater than 100 feet tall, the Project Applicant and architect shall consult with a qualified biologist experienced with bird strikes and building/lighting design issues (as approved by the City/Agency) to identify lighting-related measures to minimize the effects of the building's lighting on birds. Such measures, which may include the following and/or other measures, will be incorporated into the building's design and operation.*

- *Use strobe or flashing lights in place of continuously burning lights for obstruction lighting. Use flashing white lights rather than continuous light, red light, or rotating beams.*
- *Install shields onto light sources not necessary for air traffic to direct light towards the ground.*
- *Extinguish all exterior lighting (i.e., rooftop floods, perimeter spots) not required for public safety.*
- *When interior or exterior lights must be left on at night, the operator of the buildings shall examine and adopt alternatives to bright, all-night, floor-wide lighting, which may include:*
  - *Installing motion-sensitive lighting.*

[847] Keyes, T., *Building Bird Strike Study*, The Citizen Scientist, Non-game-Endangered Wildlife Program, 2005.
[848] Ogden, L.J., *Collision Course: The Hazards of Lighted Structures and Windows to Migrating Birds*, Wildlife Damage Management, Internet Center for Fatal Light Awareness Program (FLAP), University of Nebraska, 1996.
[849] Avery, M.L. 1979. Review of Avian Mortality due to Collisions with Manmade Structures. Wildlife Damage Management, Internet Center for Bird Control Seminars Proceedings.
[850] Klem, D., Jr. 1990. Collisions between Birds and Windows: Mortality and Prevention. Journal of Field Ornithology 61:120-128.

- > *Using desk lamps and task lighting.*
- > *Reprogramming timers.*
- > *Use of lower-intensity lighting.*

- *Windows or window treatments that reduce transmission of light out of the building will be implemented to the extent feasible.*
- *Educational materials will be provided to building occupants encouraging them to minimize light transmission from windows, especially during peak spring and fall migratory periods, by turning off unnecessary lighting and/or closing drapes and blinds at night.*
- *A report of the lighting alternatives considered and adopted shall be provided to the City/Agency for review and approval prior to construction. The City/Agency shall ensure that lighting-related measures to reduce the risk of bird collisions have been incorporated into the design of such buildings to the extent practicable.*

MM BI-20a.2 *Building Design Measures to Minimize Bird Strike Risk. During design of any building greater than 100 feet tall, the Project Applicant and architect will consult with a qualified biologist experienced with bird strikes and building/lighting design issues (as approved by the City/Agency) to identify measures related to the external appearance of the building to minimize the risk of bird strikes. Such measures, which may include the following and/or other measures, will be incorporated into the building's design.*

- *Use non-reflective tinted glass.*
- *Use window films to make windows visible to birds from the outside.*
- *Use external surfaces/designs that "break up" reflective surfaces.*
- *Place bird attractants, such as bird feeders and baths, at least 3 feet and preferably 30 feet or more from windows in order to reduce collision mortality.*
- *A report of the design measures considered and adopted shall be provided to the City/Agency for review and approval prior to construction. The City/Agency shall ensure that building design-related measures to reduce the risk of bird collisions have been incorporated to the extent practicable.*

Measures such as these have been recommended by a number of authors and organizations to reduce the potential for avian collisions with buildings.[851,852,853,854,855,856] As discussed by Klem, "there are many solutions that effectively reduce or eliminate bird strikes" at buildings,[857] and mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to birds to less-than-significant levels by incorporating these solutions. Specifically, these measures would reduce the incidence of bird strikes by requiring operational methods to reduce the effects of artificial lighting; making the structure (especially the glass surfaces) more visible from the outside with the use of external window coverings; and creating non-reflective or interference zones on or inside the glass. These measures

[851] Lights Out San Francisco. Golden Gate Audubon Society. http://www.goldengateaudubon.org/html/conservation/lightsoutsf/lightsoutsf_main.htm.
[852] Klem, D., Jr. Collisions between Birds and Windows: Mortality and Prevention. Journal of Field Ornithology 61:120-128.
[853] New York City Audubon. 2007. Bird-Safe Building Guidelines.
[854] Doeker, R. Bird-Safe Design Practices. www.birdsandbuildings.org.
[855] Bates, R. 2008. Building Bird Strike Minimization: Analysis of Applicable Technologies. Kieran Timberlake Associates.
[856] City of Toronto Green Development Standard. 2007. Bird-Friendly Development Guidelines.
[857] Klem, D., Jr. Sheet Glass: An Invisible and Lethal Hazard for Birds. http://www.windowcollisions.info/public/WK-Policy-Stat-Handout-03.pdf.

are promoted in eastern and midwestern cities such as Toronto, Chicago, and New York City where avian collisions with buildings have been much better documented than on the West Coast, and implementation of these mitigation measures would reduce potential adverse effects to less-than-significant levels.

Impact of Hunters Point Shipyard Phase II

Impact BI-20b **Implementation of the Project at HPS Phase II would not interfere substantially with the movement of resident or migratory bird species by increasing collision hazards and the amount of artificial lighting. (Less than Significant with Mitigation) *[Criterion N.d]***

Within HPS Phase II, the towers would range from 240 to 350 feet in height, and the 49ers Stadium would be up to 156 feet in height with the top of the stadium light towers at 192 feet. Migrating birds such as songbirds can be affected by human-built structures because of their propensity to migrate at night, their low flight altitudes, and their tendency to be disoriented by artificial light, making them vulnerable to collision with obstructions. Both tall structures and residential windows provide collision hazards to migrating birds. A majority of bird strikes occur when birds do not recognize windows on buildings. Thus, operation of the towers and stadium would pose collision hazards to migratory birds as effects associated with the lighting of the towers can alter the flight patterns of migratory birds and substantially increase bird strike collisions with the structures. As discussed under Impact BI-20a, large-scale avian injury or mortality due to bird strikes has not been documented at buildings on the West Coast as it has in eastern and midwestern North America. However, due to the potential for bird strikes at tall buildings on HPS Phase II, this would be a potentially significant impact.

Implementation of mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating birds to less-than-significant levels by incorporating design features that would help minimize bird strike, including using operation methods to reduce the effects of artificial lighting; making the structure, especially the glass surfaces, more visible from the outside with the use of external window coverings; and the creation of non-reflective or interference zones on or inside the glass. Consequently, implementation of these mitigation measures would reduce this impact to a less-than-significant level.

Impact BI-21: Local Plans and Policies

Impact of Candlestick Point

Impact BI-21a **Implementation of the Project at Candlestick Point would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant With Mitigation) *[Criterion N.e]***

As discussed in the consistency analysis for local policies in the Regulatory discussion above, operation of Candlestick Point would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*. In addition, the City has adopted an Urban Forestry Ordinance and Section 143 of the Planning Code to protect trees as a significant resource to the community, and as discussed in Impact BI-14a, the Project's construction-related effects would comply with the Urban Forestry Ordinance to the extent applicable and, with mitigation measure MM BI-14a, would ensure that the Project is

constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of Candlestick Point would not conflict with any local policies or ordinances protecting biological resources, and the impact would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact BI-21b **Implementation of the Project at HPS Phase II would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant With Mitigation) *[Criterion N.e]***

As discussed in the consistency analysis for local policies in the Regulatory discussion above, operation of HPS Phase II would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*. Further, as discussed in Impact BI-14b, with implementation of mitigation measure MM BI-14a, the Project's construction-related effects would be consistent with the policies set forth in the City's Urban Forestry Ordinance and policies reflected in Section 143 of the Planning Code for the protection of trees. Consequently, the operation of HPS Phase II would not conflict with any local policies or ordinances protecting biological resources, and the impact would be less than significant.

Project Impacts

The impact discussion below addresses the impacts of the overall Project, which is the combined development and operation of Candlestick Point and HPS Phase II, including the Yosemite Slough bridge.

Impact BI-22: Special-Status and/or Legally Protected Species

Impact BI-22 **Implementation of the Project would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, by the CDFG, USFWS, or NMFS. (Less than Significant with Mitigation) *[Criterion N.a]***

The Project would involve removal and/or modification of areas that have the potential to contain special-status species, including: seven potentially breeding avian species, one bat species, and four fish species (green sturgeon, Chinook, steelhead, and longfin smelt) (refer to Table III.N-5). The Project also has the potential to affect designated critical habitat of the green sturgeon and thus, directly impact threatened and/or endangered species through habitat conversion or unauthorized take. In addition, Project activities would occur within habitats of locally rare or sensitive species such as Pacific herring and Olympia oysters, as well as avian species protected by the MBTA and *California Fish and Game Code*.

Implementation of ecological Project design features described in the Draft Parks, Open Space, and Habitat Concept Plan (required by mitigation measure MM BI-7b) would result in multiple measures to avoid, limit, and mitigate for impacts to special-status and legally protected species. Specifically, the Project design components would remove invasive species; restore, preserve, and enhance wetland, aquatic and grassland habitats; create stormwater treatment wetlands; revegetate the site with extensive planting of trees and shrubs; increase the vegetative cover for foraging and dispersing animals; and maintain and enhance habitat connectivity along the shoreline.

Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. For areas that cannot be avoided, the Project Applicant would implement a comprehensive eelgrass mitigation plan that would replace at a minimum ratio of 3:1 (i.e., 3 new acres of eelgrass to 1 removed acre) the impacted areas of eelgrass and monitor them for success over sequential years, thus replacing impacted habitat and increasing its abundance regionally. Residual adverse effects would be less than significant with this mitigation.

Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur. Potential impacts to burrowing owls would be mitigated through the conservation of lands as detailed in the *California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines*, and Project-related open space preservation. Residual adverse effects would be less than significant with this mitigation.

Impacts to foraging raptors would be beneficial due to the removal of invasive plants and improvement of existing parkland through the restoration and management of native-dominated grassland. Only 5.13 acres of the lands impacted on Candlestick Point provide non-native grassland habitat that serves as foraging habitat for raptors. In addition, the Project would mitigate impacts to 43 acres of non-native grassland that provides raptor foraging habitat on HPS Phase II by restoring an equivalent amount of higher-quality native-dominated grassland specifically managed for grassland-associated species (see mitigation measure MM BI-7b). These areas would provide high-quality foraging habitat, and a net increase in the quality of raptor foraging habitat would result.

Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Residual adverse effects would be less than significant with this mitigation.

Development of the Project would require in-water work associated with the shoreline treatments. All work would occur in relatively shallow water areas that are unlikely to support foraging special-status fish. Still, the NMFS has considered the entire Bay in the site vicinity to be designated critical habitat for the green sturgeon and Central California Coast steelhead, and there is some possibility that individuals of these species, as well as other special-status fish such as Chinook salmon and longfin smelt, could be impacted by shoreline construction activities. Compensatory mitigation for Project impacts to aquatic habitat would be provided as described by mitigation measure MM BI-4a.1, and mitigation measure MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Implementation of these measures would reduce potential adverse effects on special-status fish species to less-than-significant levels. Further, a net increase of approximately 8 acres of new aquatic habitat as a result of removal of fill and structures would more than offset the loss of open water habitat.

Impacts to western red bats would be less than significant as, although the removal of large trees could lead to disturbance and mortality of a very limited number of individuals of this species, the loss or

disturbance would not represent a substantial adverse effect as it would not substantially reduce the habitat of this species, cause its population to drop below self-sustaining levels, or reduce its range. In addition, implementation of the Project's ecological design features, as described in the Draft Parks, Open Space, and Habitat Concept Plan, would result in increased habitat for this species.

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to less-than-significant by (1) determining the distribution of oyster populations within the new marina area, and (2) preparing a modeling study of potential sediment plume generation and assessing the potential for that plume to reach oysters, and using that model to guide site-specific mitigation for sedimentation impacts to oysters that would be designed to avoid, minimize, and if avoidance is not feasible, restore oyster habitat. Implementation of mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to the species. Residual adverse effects would be less than significant with implementation of this mitigation measure.

The Project, with implementation of the above identified mitigation measures and ecological design features, would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Potential adverse effects would be reduced to less-than-significant levels.

Impact BI-23: Sensitive Habitats

Impact BI-23 **Implementation of the Project would not have a substantial adverse effect on sensitive natural communities identified in local or regional plans, policies, or regulations by the CDFG, USFWS, or NMFS. (Less than Significant with Mitigation)** ***[Criterion N.b]***

No riparian habitat occupies the Study Area and the only sensitive habitats other than wetlands and aquatic habitats (discussed in Impact BI-24) are eelgrass and areas designated as EFH.

A small area of eelgrass was reported along the north shore of the South Basin directly across from Candlestick Point and a second area was identified east of the northern end of Earl Street. Together these areas make up approximately 1.99 acres of this habitat Permanent removal of this habitat or substantial loss of productivity, such that it would no longer be ecologically functional, would result in the loss of a sensitive natural community, which would be a substantial adverse effect.

The Bay in the Project vicinity has been designated EFH for the Pacific Coast Salmon Plan, Coast Pelagics Fishery Management Plan, and Pacific Groundfish Fishery Management Plan. Installation of shoreline treatments that require modification of the substrate within the Bay would be considered to result in changes to designated EFH. Installation of shoreline treatments its modification to EFH (i.e., installation of rock fill material to buttress existing bulkheads) would be considered a substantial adverse effect. To reduce these potential construction-related impacts to less-than-significant levels, mitigation measures MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would be implemented. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to EFH by

(1) determining the distribution of oyster populations within the new marina area, and (2) preparing a modeling study of potential sediment plume generation and assessing the potential for that plume to reach oysters, and using that model to guide site-specific mitigation for sedimentation impacts to EFH that would be designed to avoid, minimize, and if avoidance is not feasible, restore oyster habitat. Implementation of mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to EFH.

Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce potential Project effects on eelgrass by requiring surveys for and avoidance of this habitat. For areas than cannot be avoided, the Project Applicant would implement a comprehensive eelgrass mitigation plan that would replace at a minimum ratio of 3:1 (i.e., 3 new acres of eelgrass to 1 removed acre) the impacted areas of eelgrass and monitor them for success over a 5-year period, thus, replacing impacted habitat and increasing its abundance regionally. Residual impacts would be less than significant with implementation of this mitigation measure. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH to less-than-significant levels by (1) reducing the effects of increased contamination resulting from routine maintenance dredging by requiring that dredging occur during established work windows when sensitive fish species are less likely to be present, and (2) mandating application of BMPs to control the distribution of sediments disturbed by the dredging activities.

With implementation of the identified mitigation measures, the Project's potential adverse effects to sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFG, NMFS, or USFWS would be reduced to a less–than-significant level.

Impact BI-24: Wetlands and Jurisdictional Waters

Impact BI-24 **Implementation of the Project would not have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the *Clean Water Act* (including, but not limited to, marsh, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation) *[Criterion N.c]***

Table III.N-4 depicts on-site and off-site impact acreages resulting from site grading, materials laydown, facilities construction, vegetation removal, and installation of shoreline treatments for Candlestick Point, HPS Phase II, and Yosemite Slough bridge. Project implementation would permanently impact 0.74 acre of wetlands; including 0.17 acre of freshwater wetland, 0.42 acre of tidal salt marsh and 0.15 acre of non-tidal salt marsh. In addition, Project implementation would permanently impact 24.97 acres of Section 404 other waters. The Project would temporarily impact 0.01 acre of jurisdictional wetlands and 2.76 acres of Section 404 other waters. Temporary impacts are short term because, after construction, any areas disturbed would be restored to pre-construction conditions that would have equal or greater habitat functions and values. Approximately 3-4 acres of impacts to jurisdictional wetlands and other waters would result from the placement of marsh soils and other materials along portions of the shorelines of Candlestick Point and the southern edge of HPS Phase II to promote the development of a strip of tidal wetlands along the shoreline. Although such impacts are considered permanent, since they would modify these areas relative to their existing condition, these impacts are considered self-mitigating in that they would enhance habitat conditions relative to both the existing shoreline and, along the southern edge of HPS, the riprap

revetment that is expected to be constructed by the Navy following completion of remediation. Further, a net increase of approximately 8.09 acres of open water would occur as a result of the Project.

Of the 28.48 acres of total impacts to jurisdictional wetlands and other waters of the US that would occur as a result of the Project, jurisdictional areas that would be completely lost (i.e., converted to non-jurisdictional habitats) total only approximately 5.26 acres. This loss of habitat would occur primarily due to construction of the abutments of the Yosemite Slough bridge, along the northern approach road to the bridge, where a freshwater wetland is located in the west-central part of the site, and where construction of new breakwaters, a floating dock, and a gangway would occur at the marina. Approximately 12 acres would result from fill placed for drydock repairs, buttressing required to support existing pier walls and bulkheads, or other shoreline improvements.

The Project also includes the removal of some shoreline structures (i.e., piers and/or bulkheads) and fill material that are currently present in jurisdictional areas. For example, portions of the Re-gunning pier and edges of bulkheads along much of the eastern part of HPS Phase II would be removed to create new open-water habitat. Although these areas are considered permanently impacted for the purposes of this impact assessment, since some fill would be placed along the new shoreline of these bulkheads for stabilization purposes, removal of structures and fill would restore approximately 8 acres of aquatic habitat. Considering that marsh restoration along the southern edge of HPS and portions of Candlestick Point is responsible for approximately 3 to 4 acres of impacts, approximately 11 to 12 acres of the total 28.48 acres of impacts to jurisdictional areas on the Project site would result from activities that would enhance ecological conditions along the shoreline.

Direct removal, placement of fill into, or hydrological interruption of federally or state-protected wetlands defined that would result in a net loss of these areas would be considered a significant impact. Conformance with the CWA (via Sections 404 and 401 certification), Section 10 of the *Rivers and Harbors Act*, BCDC permitting requirements, and the NPDES regulations would ensure, among other things, that there is no net loss of wetlands and that water quality is maintained. Mitigation measures MM BI-4a.1 and MM BI-4a.2 would reduce the effects of construction-related activities to wetlands and other waters by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation, preservation, and/or restoration), obtaining permits from the USACE, SFRWQCB, and BCDC that are designed to protect wetlands and jurisdictional waters, and implementing construction Best Management Practices to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the *Clean Water Act* would be reduced to a less-than-significant level.

Impact BI-25: Wildlife Movement

Impact BI-25 **Implementation of the Project would not interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site. (Less than Significant with Mitigation)** ***[Criterion N.d]***

The Study Area is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways occur within the Study Area.

The majority of the bird species observed in the Study Area were terrestrial species, followed by shorebirds, waterfowl, gulls and terns, and raptors (in descending order). Very few Neotropical and other long-distance migrant songbirds were recorded during the survey. However, implementation of the Project would place new residential towers and a stadium with light towers along a portion of the San Francisco Bay shoreline. The increase in strike hazards from the tall buildings would be considered a potentially significant impact to migratory birds. The lighted stadium could also affect birds migrating at night, since lighting can disorient migrating birds, although lighting from the new stadium is unlikely to result in a substantially greater effect than lighting from the existing stadium on Candlestick Point.

With respect to aquatic species, the Project does not contain any substantial migratory fish pathways such as anadromous fish streams, although migratory fish do move through the open water and, possibly, into Yosemite Slough as they do throughout all of the San Francisco Bay estuary. The Project would not substantially interrupt any fish movements that currently occur. However, construction of breakwaters and other shoreline treatments in HPS Phase II would occur near eelgrass beds, which could directly or indirectly impact them such that productivity and survival of these habitats would be substantially reduced. Eelgrass communities are considered important aquatic nursery sites as they serve as a haven for numerous aquatic species. Elimination of these important nursery areas would be considered a significant impact due to the ecological importance of these habitats to aquatic species. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass by requiring survevs for and avoidance of this habitat. For areas than cannot be avoided, the applicant would implement a comprehensive eelgrass mitigation plan that would replace at a minimum ratio of 3:1 (i.e., 3 new acres of eelgrass to 1 removed acre) for impacted areas of eelgrass and monitor them for success over sequential years; thus, replacing impacted habitat and increasing its abundance regionally. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to birds to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers and design measures to make the exteriors of buildings more readily visible to birds.

With implementation of the identified mitigation measures, impacts of the Project would be reduced to a less-than-significant level as the Project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Impact BI-26: Local Plans and Policies

Impact BI-26 **Implementation of the Project would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant with Mitigation)*[Criterion N.e]***

As discussed previously, the Project would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*. However, construction activities associated with the Project could result in disturbance or loss of trees within DPW jurisdiction. These trees would be subject to the requirements of the *Public Works Code*, which specifies a process for gaining approval to remove trees, and requires the protection of trees during construction activities. Trees approved for removal must be replaced in accordance with DPW requirements. Compliance with the City's Street Tree Ordinance will reduce impacts to trees within DPW jurisdiction to a less-than-significant level.

The removal of trees located outside of DPW jurisdiction is not subject to regulation by the *Public Works Code*. However, the removal of large numbers of trees, particularly trees that meet the size definition of significant trees, without replacement of trees, could result in conflicts with policies articulated in the City's Urban Forestry Ordinance. The ordinance identifies trees as important to the urban environment because they improve air quality and wildlife habitat, contribute to psychological well-being and the aesthetic environment, and decrease noise. The City's *Planning Code* Section 143 embodies similar policies by requiring the planting of certain quantities of street trees when constructing new development in certain areas of the City. The Planning Code does not automatically apply in redevelopment areas, so the development that does not include planting of street trees would conflict with the policy goals of Section 143.

Mitigation measure MM BI-14a would encourage the preservation of street trees and trees that are large enough to meet the size specification of significant trees in the *Public Works Code*, and would require the replacement of large trees that are removed. Further, it would require the planting of street trees consistent with the intent of the *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees at the Project site and in the community. The planting of an estimated 10,000 net new trees would increase the number of trees in the Study Area considerably, increase canopy cover, and promote a healthy and sustainable urban forest. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Project would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, and impacts would be less than significant.

The Draft Parks, Open Space, and Habitat Concept Plan (required by mitigation measure MM BI-7b) includes the planting of an estimated 10,000 net new trees at the Project site and in the community, avoids removal of native trees where possible, and establishes new parkland and open space that would include a predominance of native species. Consequently, the Project would not conflict with any local policies or ordinances protecting biological resources, and overall impacts of the Project are expected to be beneficial.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts to biological resources varies, depending on the specific threshold being analyzed. The appropriate context is described for each subsection. The past and present development is generally described in the Setting section of this chapter but may also include existing development around the shoreline of the San Francisco Bay, as described in the applicable

geographic context for each criterion (refer to discussion below). Reasonably foreseeable development would include those cumulative projects that could be developed in the specified geographic area, as well as planned and in-process wetland restoration plans within the Bay area.[858] The cumulative analysis in this section is grouped by Criteria N.a through N.e identified earlier in this chapter. Criteria N.a and N.b are analyzed together. Criteria N.f and N.e. are not analyzed, as the Project would have no impact on any Habitat Conservation Plan and a beneficial impact to local plans and policies.

Effects on Candidate, Sensitive, or Special-Status Species, Riparian Habitat. or other Sensitive Natural Communities (Criteria N.a. and N.b)

The geographic context for the cumulative analysis of effects on sensitive species and sensitive natural communities is the San Francisco Bay shoreline (Region), defined north to south by the land mass and by the Carquinez Bridge on the east where I-80 crosses the Sacramento-San Joaquin Rivers at Vallejo, upstream of San Pablo Bay, and the Golden Gate Bridge on the west. This regional context contains some or all of the species and habitats identified in the Study Area. Past and present development is described in the Setting section of this chapter, along with other existing development on or adjacent to the Bay shoreline. Reasonably foreseeable development would consist of projects proposed or under construction along the shoreline of the San Francisco Bay that could affect the identified species, habitat, or sensitive natural community.

In general, cumulative projects within the Bay would include, but not be limited to new development, marinas, shoreline protection projects, flood protection projects in light of anticipated sea level rise, transportation projects, and restoration projects. These projects could involve removal and/or modification of areas that have the potential to contain special-status species and sensitive natural communities (wetlands are discussed in a separate impacts statement below). As development in the Region continues, habitat for and individuals of sensitive wildlife species native to the Region, including those species listed under federal and state ESAs and those individuals identified by state and federal resources agencies as species of concern, fully protected, or sensitive, would be lost through conversion of habitat to urbanized environment. Although more mobile species might be able to survive these changes in their environment by moving to new areas, less mobile species could simply be locally extirpated. With continued conversion of natural habitat to human use, the availability and accessibility of remaining natural habitats in this ecosystem would dwindle and those remaining natural areas may not able to support additional plant or animal populations above their current carrying capacities. Thus, the conversion of plant and wildlife habitat on a Regional level would, therefore, result in a significant regional cumulative impact on special-status species and their habitats.

The terrestrial habitats within the Project site are of low quality to terrestrial wildlife species, consisting of urbanized areas, non-native annual grassland, and landscaped areas/ornamental plants. However, some areas of moderate to high-quality habitat such as salt marsh, mud flats, and seasonal freshwater wetland, which could support special-status species, would also be impacted. The Project would also affect designated critical habitat for green sturgeon and Central California Coast steelhead, and could possibly affect individuals of these and other listed fish species. Thus, the Project could directly or indirectly impact

[858] South Bay Salt Pond Restoration Project Final Environmental Impact Statement/Environmental Impact Report. Report December 2007.

threatened and/or endangered species. Lastly, Project activities could occur within habitats of locally rare or sensitive species such as Pacific herring spawning habitat, eelgrass, Olympia oyster beds, and areas designated as EFH. Consequently, without mitigation the Project would contribute to a loss of regional biological resources through the incremental conversion of habitat for special-status species to human use.

The Project may be required to participate in mitigation plans approved by state and federal resource agencies (i.e., for green sturgeon, Central California Coast steelhead and possibly Chinook salmon and longfin smelt), which would replace lost habitat and preserve contiguous areas of habitat for these species. The Project would also implement ecological design features and mitigation measures specifically designed to avoid, reduce, or mitigate impacts to special-status/sensitive species and their habitat and reduce the Project's contribution to the cumulative loss of these species and their habitats.

Implementation of the two ecological Project design features, as described in the Draft Parks, Open Space, and Habitat Concept Plan required by mitigation measure MM BI-7b, would result in multiple measures to avoid, limit, and mitigate impacts to special-status and legally protected species. Mitigation measures MM BI-4a.1 and MM BI-4a.2 would reduce the effects on wetlands and aquatic habitats.

Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat and replacing, at a minimum ratio of 3:1 (i.e., 3 new acres of eelgrass to 1 removed acre), the impacted areas of eelgrass that cannot be avoided. Mitigation measures MM BI-6a.1 MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur. Potential impacts to burrowing owls would be mitigated through the conservation of lands as detailed in the *California Burrowing Owl Consortium's April 1995 Burrowing Owl Survey Protocol and Mitigation Guidelines*, and Project-related open space preservation. Impacts to foraging raptors would be beneficial due to the Project's ecological enhancements as described in the Draft Parks, Open Space, and Habitat Concept Plan (i.e., removal of invasive plants and improvement of existing parkland through the restoration and management of native-dominated grasslands), and the requirements specified in mitigation measure MM BI-7b. Only 5.13 acres of the lands impacted on Candlestick Point provide non-native grassland habitat that serves as foraging habitat for raptors. In addition, the Project would mitigate impacts to 43 acres of non-native grassland that provides raptor foraging habitat on HPS Phase II by restoring an equivalent amount of higher-quality native-dominated grassland specifically managed for grassland-associated species. These areas would represent high-quality foraging habitat and would result in a net increase in the quality of raptor foraging habitat. The Project would impact designated green sturgeon and Central California Coast steelhead critical habitat. However, compensatory mitigation for impacts to aquatic habitat, which include habitat used by green sturgeon and Central California Coast steelhead, would be provided as described by mitigation measure MM BI-4a.1, mitigating impacts to proposed green sturgeon critical habitat and designated Central California Coast steelhead to less-than-significant levels. In addition, the Project would create approximately 8 acres of new aquatic habitat throughout the removal of structures and fill from aquatic habitats in the Study Area. The Bay in the Project vicinity has been designated EFH for the Pacific Coast Salmon Plan, Coast Pelagics Fishery Management Plan, and Pacific Groundfish Fishery Management Plan. Installation of shoreline treatments that require modification of the substrate within the Bay would be considered a substantial adverse effect on designated EFH. Any loss of

EFH that would result from construction activities would be mitigated via the compensatory mitigation for impacts to jurisdictional waters (mitigation measure MM BI-4a.1), and mitigation measures MM BI-4a.2, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would also reduce or minimize potential adverse effects to EFH.

Consequently, with implementation of the proposed mitigation and ecological Project components the Project would mitigate any contributions to significant cumulative impact to candidate, sensitive, or special-status species, riparian habitat, or other sensitive natural communities. The Project would thus not make a cumulatively considerable contribution to a regionally significant cumulative impact.

Effects on Federally Protected Wetlands and Jurisdictional Waters (Criterion N.c)

The geographic context for the cumulative analysis of effects on wetlands or navigable waters is the San Francisco Bay shoreline and its adjacent wetlands, defined north to south by the land mass and by the Carquinez Bridge on the east where I-80 crosses the Sacramento-San Joaquin Rivers at Vallejo, upstream of San Pablo Bay, and the Golden Gate Bridge on the west. Past and present development is described in the Setting section of this chapter, along with other existing development on or adjacent to the Bay shoreline. Reasonably foreseeable development would consist of projects proposed or under construction

- along the shoreline of the San Francisco Bay, including the Yosemite Slough Restoration Project, that could affect federally protected wetlands or jurisdictional waters, either adversely (i.e., development projects) or beneficially (i.e., restoration projects). Permanent impacts are those that would remove wetlands or jurisdictional waters and not replace them in the exact same location. Temporary impacts are short term because, after construction, any areas disturbed would be restored to the previous condition.

More than 90 percent of historic tidal wetlands in the Bay Area have been lost to diking, draining, and filling.[859] The South Bay supports some of the most important habitat remaining in the entire Bay Area for a number of wildlife species, in spite of the highly urbanized surrounding areas and the dramatic alteration of the Bay itself for shipping, salt production, and urban development.[860] Wetland and jurisdictional waters restoration projects within the Bay area extensive, with approximately 40,000 acres of wetlands are either in progress or planned.[861] Although these restoration projects are attempting to reduce the cumulative loss of these habitats within the Region, the large historical loss of these areas has resulted in a cumulatively significant loss of wetlands and jurisdictional waters within the Region.

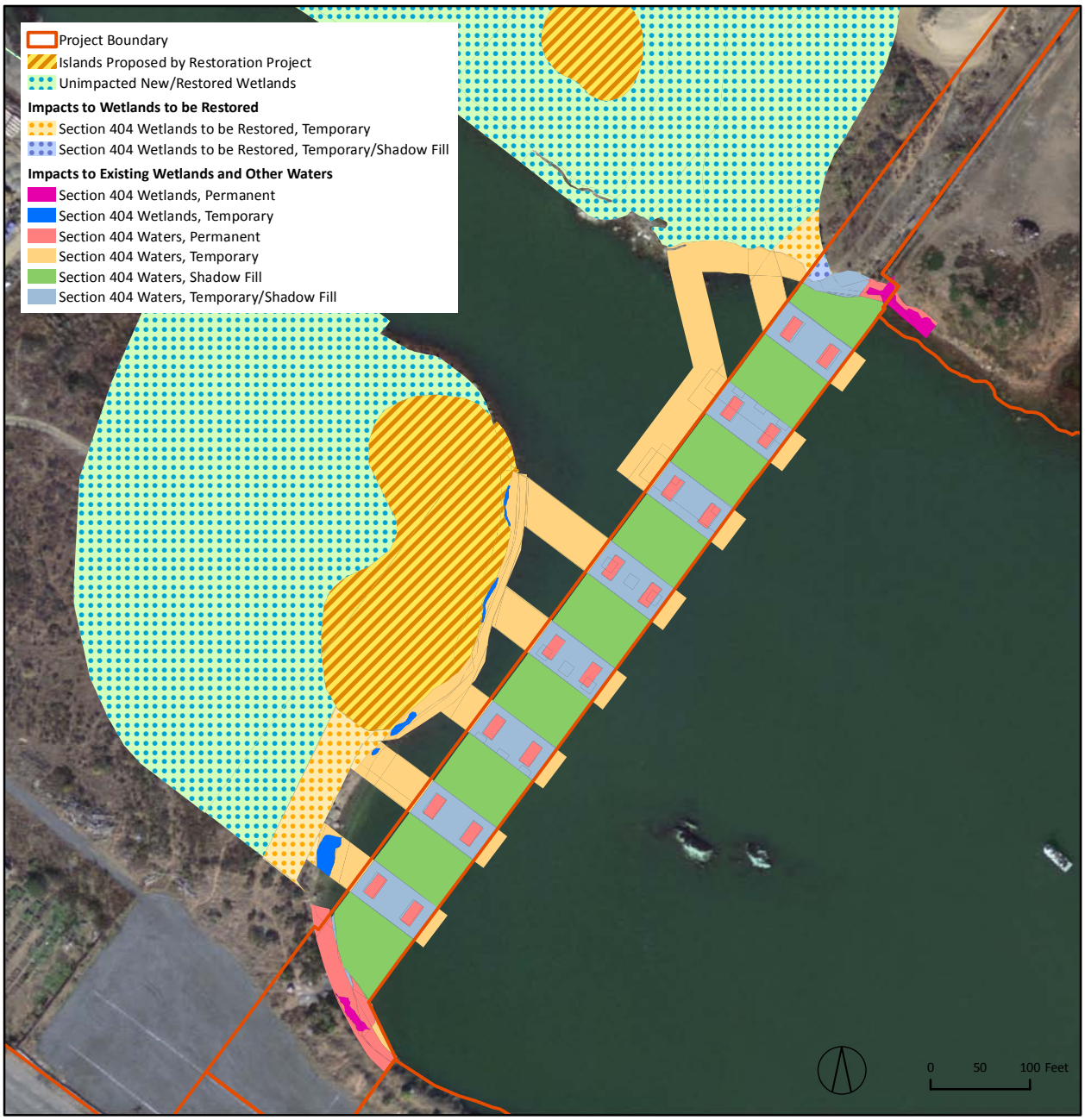
- As detailed in Table III.N-4, the Project would permanently impact 0.74 acre of wetlands and 24.97 acres of Section 404 other waters. The Project may also permanently impact 0.0992 acre and temporarily impact 0.1532 acre of a proposed Navy wetland mitigation site (refer to Figure III.N-6), if the mitigation site is constructed prior to construction of the Yosemite Slough bridge and its approaches. Temporary Project impacts would occur to 0.01 acre of wetlands and 2.76 acres of Section 404 other waters. Consequently,

[859] Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. First Reprint. US Environmental Protection Agency, San Francisco, California/San Francisco Bay Regional Water Quality Control Board, Oakland, California.
[860] Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. First Reprint. US Environmental Protection Agency, San Francisco, California/San Francisco Bay Regional Water Quality Control Board, Oakland, California.
[861] South Bay Salt Pond Restoration Project Final Environmental Impact Statement/Report. December 2007.

without mitigation of these impacts and compliance with regulations governing wetlands and jurisdictional waters, the Project would contribute to loss of wetlands and jurisdictional waters within the Region.

However, the Project also includes the removal of some shoreline structures (i.e., piers and/or bulkheads) and fill material that are currently present in jurisdictional areas. For example, portions of the Re-gunning pier and edges of bulkheads along much of the eastern part of HPS Phase II would be removed to create new open-water habitat. Although these areas are considered permanently impacted for the purposes of this impact assessment, since some fill would be placed along the new shoreline of these bulkheads for stabilization purposes, removal of structures and fill would restore approximately 8 acres of aquatic habitat. Considering that marsh restoration along the southern edge of HPS and portions of Candlestick Point is responsible for approximately 3 to 4 acres of impacts, approximately 11 to 12 acres of the total 28.48 acres of impacts to jurisdictional areas on the Project site would result from activities that would enhance ecological conditions along the shoreline.

- In response to public concerns, additional impacts to future wetland and aquatic habitat in consideration of the Yosemite Slough Restoration Project have been quantified. If the Restoration Project is implemented before the Yosemite Slough bridge is constructed, then the bridge would impact not only existing wetlands, aquatic habitats, and mud flats, but also sensitive habitats that have been restored by the Yosemite Slough Restoration Project. Based on the final Phase I Restoration Plan (on the north side of Yosemite Slough) provided by WRA, Inc. (the firm that designed the restoration plans) on 19 January 2010 and 50 percent plans for Phase II of the Restoration Plan (on the south side of Yosemite Slough) provided by WRA on 4 February 2010, additional impacts to sensitive habitats were calculated and are illustrated by Figure III.N-7 (Impacts to Wetlands and Other Waters after Yosemite Slough Wetland Restoration). Bridge construction access would result in temporary impacts to 0.21 acre of new vegetated tidal marsh that is proposed as part of the Yosemite Slough Restoration Project, but the CP-HPS Project would result in no permanent fill of new/restored wetland, aquatic, or mud flat habitat. Further, if the Restoration Project is implemented prior to bridge construction, shoreline improvements that would otherwise have been constructed to extend along the southern Yosemite Slough shoreline will not be necessary. Therefore, 0.03 acre of permanent impacts to wetlands and 0.19 acre of permanent impacts to Section 404 waters along the southern Yosemite Slough shoreline (off site) that were originally identified for the Project would not occur if Phase II of the Restoration Plan is implemented prior to bridge construction (though these existing jurisdictional areas would be temporarily impacted during bridge construction). Temporary impacts would be mitigated through implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, as required by the Project. Based on the plans for the restoration site provided by WRA as described above, less than 0.01 acre of wetlands that would be restored by the Restoration Project would be impacted by shading as a result of being located directly under the shadow of the bridge. If additional vegetated wetlands are proposed within the bridge footprint as design for Phase II of the Restoration Plan proceeds, such that additional shading impacts to vegetated wetlands would occur, and if such wetlands are constructed prior to construction of the bridge, mitigation for such impacts will be provided by the CP HPS Project at a 1:1 ratio as described above.



SOURCE: HT Harvey, 2010; Moffat & Nichol, 2009; Mactec, 2010; PBS&J, 2010. PBS&J 05.07.10

FIGURE III.N-7 Candlestick Point - Hunters Point Shipyard Phase II EIR

IMPACTS TO WETLANDS AND OTHER WATERS AFTER YOSEMITE SLOUGH WETLAND RESTORATION

Any alterations of, or discharges into, waters of the United States, including Section 404 wetlands must be in conformance with the CWA via Section 404 permitting and Section 401 certification prior to any grading or construction that may impact jurisdictional area(s), as appropriate. Additionally, a SAA per Section 1600 of the *California Fish and Game Code* would be required for removal of any CDFG-jurisdictional areas, if present. Also, runoff produced during and after construction is subject to NPDES and local water quality and runoff standards. Compensation for impacts to wetlands and jurisdictional waters are developed as a part of the permitting process with the USACE, or for non-USACE-jurisdictional wetlands, during permitting through the SFRWQCB, BCDC, and/or CDFG. The exact mitigation ratio is variable, and would be based on the type and value of the wetlands or jurisdictional waters affected, and would be established during the permitting process; however, at a minimum, compensation would result in compliance with the state[862] and federal[863] "no net loss of wetlands" policies, resulting in a minimum 1:1 mitigation ratio. Therefore, minimizing impacts to jurisdictional wetlands and other waters; compensating for impacts to these habitats; securing a SAA from the CDFG (if applicable) and 404 and 401 permits under the CWA; and compliance with the federal and state "no net loss of wetlands" policy would protect the hydrology and ecology of the wetlands and jurisdictional waters within the Project site and the Bay and its adjacent wetlands. Impacts from the Project to these habitats would thus be fully compensated. Therefore, because no long-term net loss of wetland resources would be attributable to the Project, development of the Project would not make a cumulatively considerable contribution to the regionally significant cumulative impact.

Interfere Substantially with Movement of Native Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors, or Impede the Use of a Native Wildlife Nursery Site (Criterion N.d)

The geographic context for the analysis of cumulative impacts on movement of native fish or wildlife species is the San Francisco Bay, both the aquatic portion and adjacent lands, which represents an area of possible connectivity or relationship in terms of wildlife movement. This area includes the shoreline and extends out into the Bay to include any area of in-water construction. The past and present development is described in the Setting section of this chapter, representing the baseline conditions for the evaluation of cumulative impacts. Reasonably foreseeable development would be those cumulative projects that could be developed in the specified geographic area.

Development over the past 150 years has encroached upon and displaced biological resources throughout the City of San Francisco and the areas surrounding the Bay. The conversion of grassland, oak woodland, riparian woodland, riverine, wetland, and other native habitats to urban and suburban development has not only resulted in considerable habitat loss, but has resulted in habitat fragmentation such that native non-avian wildlife species occurring in intact patches of native terrestrial habitat cannot readily access other intact terrestrial habitat patches. The lack of connectivity between native habitat patches has rendered many terrestrial species once common to those habitat patches susceptible to local extinction. In addition the conversion of the Bay's wetlands, eelgrass, and other aquatic habitats to other habitats and/or uses has resulted in these potential nursery sites being no longer available to the species that would have historically utilized them. Consequently, the conversion of open areas, both terrestrial and aquatic, on a Regional level

[862] http://ceres.ca.gov/wetlands/policies/governor.html.
[863] http://www.fws.gov/policy/660fw1.html.

as a result of cumulative development would result in a regionally significant cumulative impact on wildlife movement corridors and nursery sites.

Wildlife Movement

The Study Area does not include any regional wildlife corridor or migratory pathways. The site is surrounded by open water and urban development and contains no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways. There would be no impact to regional terrestrial (non-avian) wildlife movement. The Project would be located along the Pacific Flyway for migratory birds. Migrating birds, such as songbirds, can be affected by human-built structures because of their propensity to migrate at night, their low flight altitudes, and their tendency to be disoriented by artificial light, making them vulnerable to collision with obstructions. This is a potentially significant cumulative impact. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the Project's effects of operational activities related to tall structures and increased lighting to birds to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operation methods to reduce the effects of artificial lighting; making the structure, especially the glass surfaces, more visible from the outside with the use of external window coverings; and the creation of non-reflective or interference zones on or inside the glass. By implementing these measures, the design of towers that would be constructed in the Project area would be more "bird-friendly", thus resulting in less risk of avian collisions, than the numerous tall buildings that have been constructed in the region that were not designed and/or are not operated with minimizing avian collision risk in mind. Consequently, implementation of the Project would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors and the Project would not make a considerable contribution to this cumulative impact.

Nursery Sites

Construction of the Project and the cumulative projects on the shoreline or in-water in the vicinity of eelgrass beds could remove them or indirectly impact them such that productivity and survival of these habitats would be reduced. Eelgrass communities are considered important aquatic nursery sites as they serve as a haven for numerous aquatic species. Elimination of these important nursery areas would be a significant impact if it would impede the use of the eelgrass habitat. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce potential Project effects on eelgrass by requiring surveys for and avoidance of this habitat. For areas than cannot be avoided, this habitat would be replaced at a minimum ratio of 3:1 (i.e., 3 new acres of eelgrass to 1 removed acre) thus, replacing impacted habitat. Consequently, implementation of the Project would not impede the use of native wildlife nursery sites and the Project would not make a considerable contribution to this cumulative impact.

Overall, the Project's contribution to the cumulative impact on wildlife movement and wildlife nursery sites would be reduced to less than considerable by implementation of the above- mentioned mitigation measures. The Project's cumulative impact would, therefore, be less than significant.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
			PLANTS	
Adobe sanicle	*Sanicula maritima*	none/SR/1B.1	Chaparral, coastal prairie, meadows and seeps, and valley and foothill grasslands in association with clay or serpentine soils. 98–787 feet (30–240 meters); blooms February–May	**Not Likely.** Suitable habitat for this species occurs in the Study Area. However, there are no recorded occurrences of this species within 5 miles of the Study Area, and none were observed during rare plant surveys of suitable habitat in 2007 and 2008 by PBS&J.
Alkali milk-vetch	*Astragalus tener* var. *tener*	none/none/1B.2	Playas, valley and foothill grassland with adobe clay, and vernal pools with alkaline soils. 0–2051 feet (0–625 meters); blooms May–September.	**Not Likely.** Suitable habitat for this species does not occur in the Study Area.
Arcuate bush-mallow	*Malacothamnus arcuatus*	none/none/1B.2	Chaparral and cismontane woodland. 82–295 feet (25–90 meters); blooms April–September.	**Not Likely.** Suitable habitat for this species does not occur in the Study Area.
Beach layia	*Layia carnosa*	FE/SE/1B.1	Coastal dunes and coastal scrub with sandy soils. 0–197 feet (0–60 meters); blooms March–July.	**Not Likely.** Coastal scrub does not occur in the Study Area. This species was not observed during surveys conducted by PBS&J in 2007 and 2008.
Bent-flowered fiddleneck	*Amsinckia lunaris*	none/none/1B.2	Coastal bluff scrub, cismontane woodland, and valley and foothill grassland habitats. 10–1,640 feet (3– 500 meters); blooms March–June	**Not Likely.** Although there is one recorded occurrence of this species within 5 miles of the Study Area, no species of *Amsinckia* were observed during floristic surveys conducted in 2005 by CNPS[864] and in 2007 and 2008 by PBS&J.
Big-scale balsamroot	*Balsamorhiza macrolepis* var. *macrolepis*	none/none/1B.2	Occurs in chaparral, cismontane woodland, and valley and foothill grassland, sometimes in serpentine soil substrates at elevations ranging from 295–4,593 feet (90–1,400 meters); blooms March–June.	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Balsamorhiza* were observed during floristic surveys conducted in 2005 by CNPS[865] and in 2007 and 2008 by PBS&J.
Blue coast gilia	*Gilia capitata* ssp. *chamissonis*	none/none/1B.1	Coastal dunes and coastal scrub. 7–656 feet (2–200 meters); blooms April–July.	**Not Likely.** Coastal scrub does not occur in the Study Area. There are no recorded occurrences of this species within 5 miles of the Study Area.
Bristly sedge	*Carex comosa*	none/none/2.1	Coastal prairie, marshes and swamps (along lake margins), and valley and foothill grassland. 0–2,051 feet (0–625 meters); blooms May–September.	**Not Likely.** Marsh habitat in the Study Area has been highly degraded. This species was not observed during surveys conducted by Caltrans in 2007.[866]

[864] California Native Plant Society (CNPS), Yerba Buena Chapter, Electronic plant list; Hunters Point Serpentine Hillside, R. Hunter and J. Sigg, 2005.
[865] Ibid.
[866] Jones and Stokes, Natural Environmental Study Report for the Bayview Transportation Improvements Project, June 2009.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
California seablite	*Suaeda californica*	FE/none/1B.1	Marshes and swamps with coastal salt marsh. 0–49 feet (0–15 meters); blooms July–October.	**Not Likely.** Marsh habitat in the Study Area has been highly degraded. This species was not observed during surveys conducted by Caltrans in 2007.[867]
Coastal triquetrella	*Triquetrella californica*	none/none/1B.2	A moss that occurs in coastal bluff scrub and coastal scrub. 33–328 feet (10–100 meters).	**Not Likely.** Coastal scrub does not occur in the Study Area.
Compact cobwebby thistle	*Cirsium occidentale* var. *compactum*	none/none/1B.2	Chaparral, coastal dunes, coastal prairie, and costal scrub. 16–492 feet (5–150 meters); blooms April–June.	**Not Likely.** Coastal scrub does not occur in the Study Area. No native species of *Cirsium* were observed during floristic surveys conducted in 2005 by CNPS[868] and in 2007 and 2008 by PBS&J.
Crystal Springs lessingia	*Lessingia arachnoidea*	none/none/1B.2	Cismontane woodland, coastal scrub, and valley and foothill grassland habitats, in association with serpentinite soils along roadsides. 197–656 feet (60–200 meters); blooms July–October	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Lessingia* were observed during floristic surveys conducted by CNPS[869] and PBS&J in 2007 and 2008.
Diablo helianthella	*Helianthella castanea*	none/none/1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland. 197–4,265 feet (60–1,300 meters); blooms March–June.	**Not Likely.** Chaparral or oak woodland absent in Study Area.
Fountain thistle	*Cirsium fontinale* var. *fontinale*	FE/SE/1B.1	Openings in chaparral habitats; valley and foothill grassland habitats in association with serpentinite seeps. 295–574 feet (90–175 meters); blooms June–October	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no native species of *Cirsium* were observed during floristic surveys conducted by CNPS[870] and PBS&J in 2007 and 2008.
Fragrant fritillary	*Fritillaria liliacea*	none/none/1B.2	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland habitats often in association with serpentinite soils. 10–1,345 feet (3–410 meters); blooms February–April	**Not Likely.** Although there is one recorded occurrence of this species within 5 miles of the Study Area, no species of *Fritillaria* were observed during floristic surveys conducted by CNPS[871] and PBS&J in 2007 and 2008.

867 Jones and Stokes, Biological Assessment for the Bayview Transportation Improvements Project, June 2009.
868 California Native Plant Society (CNPS), Yerba Buena Chapter, Electronic plant list; Hunters Point Serpentine Hillside, R. Hunter and J. Sigg, 2005.
869 Ibid.
870 Ibid.
871 Ibid.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Franciscan manzanita	*Arctostaphylos hookeri* ssp. *franciscana*	none/none/1A	Coastal scrub with serpentinite soil substrates. 197–984 feet (60–300 meters); blooms February–April.	**Not Likely.** Serpentinite soil substrates do not occur within Study Area. No recorded occurrences of this species within 5 miles of the Study Area. No species of *Arctostaphylos* were observed during surveys conducted by Caltrans in 2007[872] and PBS&J in 2007 and 2008.
Franciscan onion	*Allium peninsulare* var. *franciscanum*	SLC/none/1B.2	Clay and serpentine soils on dry hillsides in woodlands and valley and foothill grasslands 170–984 feet (52–300 meters); blooms May–June.	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Allium* were observed during floristic surveys conducted by CNPS[873] and PBS&J in 2007 and 2008.
Franciscan thistle	*Cirsium andrewsii*	none/none/1B.2	Broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub habitats, often in association with serpentinite soils. 0–492 feet (0–150 meters); blooms March–July	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no native species of *Cirsium* were observed during floristic surveys conducted by CNPS[874] and PBS&J in 2007 and 2008.
Hillsborough chocolate lily	*Fritillaria biflora* var. *ineziana*	none/none/1B.1	Cismontane woodland and valley and foothill grassland habitats in association with serpentinite soils. 492 feet (150 meters); blooms March–April	**Not Likely.** Known only from the Hillsborough area. Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no native species of *Fritillaria* were observed during floristic surveys conducted by CNPS[875] and PBS&J in 2007 and 2008.
Kellogg's horkelia	*Horkelia cuneata* ssp. *sericea*	none/none/1B.1	Closed-cone coniferous forest, chaparral, coastal dunes, and coastal scrub with sandy or gravelly openings. 33–656 feet (10–200 meters); blooms April–September.	**Not Likely.** Coastal scrub does not occur in the Study Area.
Marin western flax	*Hesperolinon congestum*	FT/ST/1B.1	Chaparral and valley and foothill grassland habitats in association with serpentinite soils. 16–1214 feet (5–370 meters); blooms April–July	**Not Likely.** Although there are recorded occurrences of this species within 5 miles of the Study Area, no species of *Hesperolinon* were observed during floristic surveys conducted by CNPS and PBS&J in 2007 and 2008.

[872] Jones and Stokes, Natural Environmental Study Report for the Bayview Transportation Improvements Project, June 2009.
[873] California Native Plant Society (CNPS), Yerba Buena Chapter, Electronic plant list; Hunters Point Serpentine Hillside, R. Hunter and J. Sigg, 2005.
[874] Ibid.
[875] Ibid.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Montara manzanita	*Arctostaphylos montaraensis*	none/none/1B.2	Chaparral and coastal scrub. 492–1,640 feet (150–500 meters); blooms January–March.	**Not Likely.** Coastal scrub does not occur in the Study Area. No species of *Arctostphylos* were observed during surveys conducted by Caltrans in 2007[876] and PBS&J in 2007 and 2008.
Most beautiful jewel-flower	*Streptanthus albidus* ssp. *permoenus*	none/none/1B.2	Chaparral, cismontane woodland, valley and foothill grasslands, often on serpentine soils. 361–3,281 feet (110–1,000 meters); blooms April–June.	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Streptanthus* were observed during floristic surveys conducted by CNPS and PBS&J in 2007 and 2008.
Pacific manzanita	*Arctostaphylos pacifica*	none/SE/1B.2	Chaparral and coastal scrub. 1,083 feet (330 meters); blooms February–April.	**Not Likely.** Coastal scrub does not occur in the Study Area. Species of *Arctostaphylos* not identified during surveys.
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	none/none/1B.2	Coastal salt marsh. 0–33 feet (0–10 meters); blooms June–October.	**Not Likely.** Marsh habitat in the Study Area is of marginal quality and has been highly degraded. This species was not observed during surveys conducted by Caltrans in 2007.[877] Observed in adjacent off-site locations to the Yosemite Slough area according to the Yosemite Slough IS/MND.[878] Was not observed in the Yosemite Slough area during 2005 surveys conducted by LSA.
Presidio clarkia	*Clarkia franciscana*	FE/SE/1B.1	Occurs in coastal scrub and valley and foothill grassland, often on serpentine soils. 82–1,099 feet (25–335 meters); blooms May–July	**Not Likely.** Known from fewer than five occurrences. The closest two known populations are in the San Francisco Presidio approximately 6 miles northwest. Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Clarkia* were observed during floristic surveys conducted by CNPS[879] and PBS&J in 2007 and 2008.
Presidio manzanita	*Arctostaphylos hookeri ssp. ravenii*	FE/SE/1B.1	Chaparral, coastal prairie, and coastal scrub with serpentinite outcrops. 148–705 feet (45–215 meters); blooms February–March.	**Not Likely.** Serpentinite soil substrates do not occur within Study Area; however, there are no recorded occurrences of this species within 5 miles of the Study Area. Species of *Arctostaphylos* not identified during surveys.

[876] Jones & Stokes, Natural Environmental Study Report for the Bayview Transportation Improvements Project, June 2009.
[877] Jones and Stokes, Biological Assessment for the Bayview Transportation Improvements Project, June 2009.
[878] California State Parks Foundation, Draft Initial Study –Mitigated Negative Declaration for the Candlestick Point State Recreation Area Yosemite Slough Restoration Project, December 2005.
[879] California Native Plant Society, California Native Plant Society, Yerba Buena Chapter, Electronic plant list; R. Hunter and J. Sigg, 2005.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Robust spineflower	*Chorizanthe robusta* var. *robusta*	FE/none/1B.1	Chaparral, cismontane woodlands (in openings), coastal dunes, coastal scrub with sandy or gravelly soil. 10–984 feet (3–300) meters; blooms April–September.	**Not Likely.** Coastal dunes are absent from the Study Area. Remnant dunes in the Study Area are disturbed habitat. This species was not observed during surveys conducted by PBS&J in 2007 and 2008.
Rose leptosiphon	*Leptosiphon rosaceus*	none/none/1B.1	Coastal bluff scrub. 0–328 feet (0–100 meters); blooms April–July.	**Not Likely.** Suitable habitat for this species does not occur in the Study Area.
San Bruno Mountain manzanita	*Arctostaphylos imbricata*	none/SE/1B.1	Chaparral and coastal scrub with rocky substrate. 902–1,214 feet (275–370 meters); blooms February–May.	**Not Likely.** Coastal scrub does not occur in the Study Area. Species of *Arctostaphylos* not identified during surveys.
San Francisco Bay spineflower	*Chorizanthe cuspidate* var. *cuspidata*	none/none/1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, and coastal scrub with sandy soils. 10–705 feet (3–215 meters); blooms April–July (uncommon in August).	**Not Likely.** Coastal scrub does not occur in the Study Area.
San Francisco campion	*Silene vercunda* ssp. *verecunda*	none/none/1B.2	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland with sandy soil. 98–2,116 feet (30–645 meters); blooms March–June (uncommon in August).	**Not Likely.** Coastal scrub does not occur in the Study Area.
San Francisco Collinsia	*Collinsia multicolor*	none/none/1B.2	Closed-cone coniferous forest and coastal scrub (sometimes with serpentinite soil). 98–820 feet (30–250 meters); Blooms March–May.	**Not Likely.** Coastal scrub does not occur in the Study Area.
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	none/none/1B.2	Coastal bluff scrub, coastal scrub, and valley and foothill grassland habitats in association with sandy or serpentinite soils. 49–1,312 feet (15–400 meters); blooms June–September	**Not Likely.** Although there are a number of recorded occurrences of this species within 5 miles of the Study Area, this species was not observed during floristic surveys conducted by CNPS[880] and PBS&J in 2007 and 2008.
San Francisco Lessingia	*Lessingia germanorum*	FE/SE/1B.1	Coastal scrub (remnant dunes). 82–295 feet (25–90 meters); blooms July–November (uncommon in June).	**Not Likely.** Coastal scrub does not occur in the Study Area. This species was not observed in sandy soil areas during surveys; no species of *Lessingia* were observed during floristic surveys conducted by CNPS[881] and PBS&J in 2007 and 2008.

[880] Ibid.
[881] Ibid.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
San Francisco owl's-clover	*Triphysaria floribunda*	none/none/1B.2	Coastal prairie, coastal scrub, and valley and foothill grassland habitats in association with serpentinite soils. 33–525 feet (10–60 meters); blooms April–June	**Not Likely.** Although there is one recorded occurrence of this species within 5 miles of the Study Area, no species of *Triphysaria* has been observed during floristic surveys conducted by CNPS[882] and PBS&J in 2007 and 2008.
San Francisco popcornflower	*Plagiobothrys diffusus*	None/SE/ 1B.1	Occurs in coastal prairie and valley and foothill grassland. 197–1,181 feet (60–360 meters); blooms March–June.	**Not Likely.** Known from fewer than ten occurrences. Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Plagiobothrys* were observed during floristic surveys conducted by CNPS[883] and PBS&J in 2007 and 2008.
SanMateo thorn-mint	*Acanthomintha duttonii*	FE/SE/1B.1	Chaparral and valley and foothill grassland habitats, often on serpentinite soil substrates. 164–984 feet (50–300 meters); blooms April–June	**Not Likely.** Serpentinite soil substrates do not occur within Study Area, however there are no recorded occurrences of this species within 5 miles of the Study Area; species of *Acanthomintha* were not observed during floristic surveys conducted by CNPS[884] and PBS&J in 2007 and 2008.
Santa Cruz microseris	*Stebbinsoseris decipiens*	none/none/1B.2	Openings in broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grasslands, sometimes on serpentine soils. 33–1,640 feet (10–500 meters); blooms April–May.	**Not Likely.** Although potentially suitable habitat and soil substrates are present, there are no recorded occurrences of this species within 5 miles of the Study Area; no species of *Stebbinsoseris* were observed during floristic surveys conducted by CNPS[885] and PBS&J in 2007 and 2008.
Short-leaved evax	*Hesperevax sparsiflora* var. *brevifolia*	none/none/2.2	Coastal bluff with sandy soil and coastal dunes. 0–705 feet (0–215 meters); blooms March–June.	**Not Likely.** Suitable habitat for this species does not occur in the Study Area.
White-rayed pentachaeta	*Pentachaeta bellidiflora*	FE/SE/List 1B.1	Occurs in cismontane woodland and valley and foothill grassland, often in serpentinite. 115–2034 feet (35–620 meters); blooms March–May	**Not Likely.** Although there is one recorded occurrence of this species within 5 miles of the Study Area, no species of *Pentachaeta* were observed during floristic surveys conducted by CNPS[886] and PBS&J in 2007 and 2008.

[882] Ibid.
[883] Ibid.
[884] Ibid.
[885] Ibid.
[886] Ibid.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
			SENSITIVE NATURAL COMMUNITIES	
Coastal brackish marsh (salt marsh)		CDFG Sensitive Habitat		**Known.** The Study Area supports representative assemblages of plant species associated with this community type. Degraded occurrences of this sensitive natural community are present along the southern portion of HPS Phase II site, along Yosemite Slough, and patches along the Candlestick Point shoreline.[887]
			INVERTEBRATES	
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT/none/none Critical habitat	All habitats for the bay checkerspot are on shallow, serpentine-derived, or similar soils. These soils support the plants on which the caterpillars (larvae) feed the primary larval host plant is dwarf plantain (*Plantago erecta*). In many years, the plantain dries up and the larvae transfer to a second host plant, Indian paintbrush, or purple owl's clover (*Castilleja exserta* spp. *exerta*), which remains edible later in the season.	**Not Likely.** It is not likely that there is a sufficient population of plantain to support Bay checkerspot in the Study Area.[888] Sites that support this species provide greater topographic heterogeneity than the serpentine grassland in the Study Area. Although there are a number of recorded occurrences for this species within 5 miles of the Study Area, this species was extirpated from the closest location of historical occurrence (San Bruno Mountain) in the 1980's.
Callippe silverspot butterfly	*Speyeria callippe callippe*	FE/none/none	Occurs in grassland habitats around the northern Bay Area containing Johnny jump-up (*Viola pedunculata*), which is the larval host plant for this species.	**Not Likely.** Although there are a number of recorded occurrences within 5 miles of the Study Area, *V. pedunculata* has not been observed within the Study Area. In addition, although there are nearby occurrences, there is an insufficient population of this species' host plant within the Study Area to sustain a population of this species.[889]

[887] H.T. Harvey & Associates, Hunters Point Shipyard and Candlestick Point State Recreation Area Final Delineation of Wetlands and Other Waters, San Francisco, California, February 2009 and revised July 13, 2009 and October 2, 2009.
[888] Kobernus, P., Senior Biologist, TRA Environmental Sciences, Inc., email to PBS&J, August 30, 2007.
[889] Ibid.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Mission blue butterfly	*Plebejus* [*Icaricia*] *icarioides missionensis*	FE/none/none	The adults feed on hairy false goldenaster (*Heterotheca villosa*), blue dicks (*Dichelostemma capitatum*), and seaside buckwheat (*Eriogonum latifolium*). They do not wander far from the three species of lupine that are the larval food plant: silver lupine (*Lupinus albifrons*), summer lupine (*L. formosus*), and many-colored lupine (*L. versicolor*). Females lay eggs throughout the mating flight. The eggs are laid singly on leaves, stems, flowers, and seedpods of lupine species.	**Not Likely.** Although there are a number of recorded occurrences for this species within 5 miles of the Study Area, including one from the Bayview Hill area, the Study Area does not support a substantial stand of lupine (*Lupinus* spp.) to support this species.[890] Isolated lupine plants intermixed within ruderal vegetation was observed along the Candlestick Point area, near Yosemite Slough. One or two lupine plants were observed in this area during the May 5, 2008 survey, but this would not constitute habitat for this species.
Monarch butterfly (wintering)[891]	*Danaus plexippus*	none/none/ESHA	Occur in many open habitats including fields, meadows, weedy areas, marshes, and roadsides. Adults migrate from August to October, flying south to hibernate along the California coast and in central Mexico. During migration and wintering, butterflies roost in trees and form huge aggregations. Caterpillars feed exclusively on milkweed (*Asclepias* spp.); early in the season, adults sip nectar from dogbane (*Apocynum* spp.), lilac (*Ceanothus* spp.), red clover (*Trifolium pratense*), *Lantana* spp., and thistles (*Cirsium* spp.). In the fall adults visit composites including goldenrods (*Solidago californica*), blazing stars (*Liatris spicata*), ironweed (*Vernonia* spp.), and tickseed sunflower (*Bidens* spp.).	**Known, but Not Likely roosting.** Although individuals have been observed on the site, there is no record of monarch butterfly autumnal (i.e., temporary bivouac site) or over-wintering use of the Study Area in the CNDDB and other records, including anecdotal observations. The nearest observations of such roosts are at Fort Mason, the Presidio of San Francisco, and Stern Grove. The modification of Hunters Point and Candlestick Park would not affect those sites.[892]
Myrtle's silverspot butterfly	*Speyeria zerene myrtleae*	FE/none/none	Occurs in grassland habitats around the northern Bay Area. The larval host plant is hookspur violet (*Viola adunca*). Adults feed on nectar from flowers including hairy gumweed, coastal sand verbena (*Abronia latifolia*), mints (or monardella) (*Monardella* spp.), bull thistle (*Cirsium vulgare*), and seaside fleabane (*Erigeron glaucus*).	**Not Likely.** There are no recorded occurrences of this species within 5 miles of the Study Area. The Study Area does not support the suitable host plants for this species.

[890] United States Fish and Wildlife Service (USFWS), Endangered and Threatened Wildlife and Plants*: Proposed Determination of Critical Habitat for Six Butterflies and Two Plants*, 42 Federal Register 7972, February 8, 1977.
[891] Wintering habitat is considered an Environmentally Sensitive Habitat Area by the California Coastal Commission.
[892] Monroe, M., Ranger, Muir Woods National Monument, telephone conversation with Todd Wong, July 16, 2008.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
San Bruno elfin butterfly	*Callophyrs* [*Incisalia*] *mossii bayensis*	FE/none/none	Endemic to the coastal mountains near San Francisco Bay. Eggs are laid in small clusters or strings on the upper or lower surface of broadleaf stonecrop (*Sedum spathulifolium*). The adult food plants have not been fully determined but Montara Mountain colonies are suspected to use Montara manzanita (*Arctostaphylos montaraensis*) and California huckleberry (*Vaccinium ovatum*).	**Not Likely.** There are a number of recorded occurrences for this species within 5 miles of the Study Area. However, the San Bruno elfin is found in the fog-belt of steep north facing slopes that receive little direct sunlight. It lives near prolific growths of the larval food plant, stonecrop, which is a low growing succulent. The Study Area does not support suitable larval and adult host plants.[893]
			MOLLUSKS	
Black abalone	*Haliotes cracherodii*	FC/none/none	Endemic to Santa Barbara Channel Islands.	**Absent.** The Study Area is outside the range of this species.
White abalone	*Haliotes sorenseni*	FE/none/none	Rocky marine subtidal (to 200 feet deep) and extreme lower intertidal (below 15 feet deep) habitats. Current population extremely depleted.	**Absent.** The Study Area is too shallow and modified to provide suitable habitat.
Olympia oyster	*Ostreola conchaphila*	none/none/CEQA	Native Olympia oysters were historically abundant in San Francisco Bay, and small populations of native oysters have been documented within the Bay. Suitable substrate includes solid surfaces to which the larvae can easily attach.	**High.** Because the larval forms of oysters are free-floating in the Bay and a large population exists south of the Study Area at Oyster Point Marina, native oysters are likely present on suitable substrate throughout the Study Area.
			FISH	
Pacific herring	*Clupea pallasi*	none/none/CEQA	Pacific herring generally enter the Bay from November through April of each year and spawn in intertidal and sub-tidal habitats.	**Known**. According to NMFS, known herring spawning areas within the Study Area include several piers and areas of shoreline both north and south of the proposed marina.
Chinook salmon –Spring-run ESU	*Oncorhynchus tshawytscha*	FT/ST/none	Central Valley streams with stable water supply, clean gravel, and good quality riparian habitat. Spawning occurs only in tributaries to the Sacramento River.	**Low.** The Study Area is outside the migratory corridor for this species. Adults migrate from the Golden Gate into the Sacramento River.
Chinook salmon –Winter-run ESU	*Oncorhynchus tshawytscha*	FE/ST/none Critical habitat	Central Valley streams with stable water supply, clean gravel, and good quality riparian habitat. Spawning occurs upstream of the Red Bluff Diversion Dam.	**Low.** The Study Area is generally outside the migratory corridor for this species. Adults migrate from the Golden Gate into the Sacramento River. Study Area is outside of designated critical habitat.

[893] Kobernus, P., Senior Biologist, TRA Environmental Sciences, Inc., email to PBS&J, August 30, 2007.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Chinook salmon –Fall/Late Fall-run ESUs	*Oncorhynchus tshawytscha*	SC/SSC/none	The most abundant Chinook in the Central Valley. Fall/Late fall-run fish spawn in streams with stable water supply, clean gravel, and good quality riparian habitat.	**Low.** The Study Area is generally outside the migratory corridor for this ESU. A population exists in the South Bay that would migrate past the Study Area on the way to and from the ocean. The origin and status of this population is unclear (refer to text).
Coho salmon—Central California ESU	*Oncorhynchus kisutch*	FE/SE/none	Spawning in accessible coastal streams, generally in areas with complex instream habitat, heavy forest cover, and high quality water. Juveniles rear in these areas for two years before migrating to the ocean.	**Absent.** This species does not currently exist in the San Francisco Bay.[894]
Delta smelt	*Hypomesus transpacificus*	FT/SE/none	Endemic to the Sacramento-San Joaquin Delta. Adults spawn in freshwater in the upper Delta. The rest of the year, they reside primarily in the interface between salt and freshwater of the Sacramento-San Joaquin Delta at salinities less than 2 parts per million.	**Absent.** The Study Area is outside the known range of this species.
Longfin smelt	*Spirinchus thaleichthys*	none/ST/none	Native to San Francisco Bay. Adults spawn in upper estuary in early winter. Larvae are dispersed by downstream flow and distribution is determined by outflow. Adults found outside the Bay in some years.	**Moderate.** Based on a 2009 status review, distribution of larval fish is determined by outflow from the Sacramento-San Joaquin River Estuary where adults spawn.[895] As they develop swimming ability, they could disperse into the Study Area. They are captured as by-catch in the Bay for bay shrimp (*Crangon franciscorum*).
Green sturgeon	*Acipenser medirostris*	FT/SSC/none Proposed Critical Habitat	Migrates through the San Francisco Bay to spawning grounds in the upper Sacramento River. Juveniles move into the estuary and likely rear in San Francisco Bay.	**High.** The species likely forages in the Bay including the area near the Study Area. The Study Area is within proposed critical habitat for this species.
Steelhead—Central California Coast DPS	*Oncorhynchus mykiss*	FT/none/none Critical habitat	Spawns in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating to the ocean.	**High.** Juveniles and adult steelhead could be found in the open waters adjacent to the Study Area as they migrate to and from streams in the San Francisco Bay. Populations are known from relatively nearby creeks on the peninsula (i.e., San Francisquito Creek). The Study Area is within designated critical habitat for this DPS.
Steelhead—Central Valley DPS	*Oncorhynchus mykiss*	FT/none/none Critical habitat	Spawns in cool, clear, well-oxygenated streams. Juveniles remain in freshwater for one or more years before migrating to the ocean.	**Low.** Even though their primary migratory pathway is into the Sacramento River, juveniles and adult steelhead could potentially be found in the Bay near the Project. The Study Area is outside of designated critical habitat for this DPS.

[894] Jones and Stokes, Biological Assessment for the Bayview Transportation Improvements Project, June 2009.
[895] California Department of Fish and Game (CDFG), *A Status Review of the Longfin Smelt (Spirinchus thaleichthys) in California, January 2009*.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Tidewater goby	*Eucyclogobius newberryi*	FE/SSC/none	Brackish water habitats along coast, fairly still but not stagnant water and high oxygen levels.	**Absent.** The shoreline of the Study Area is influenced by tidal activity. Brackish water habitat absent. Due to degradation lagoon/estuary habitat does not exist.[896]
			AMPHIBIANS	
California red-legged frog	*Rana aurora draytonii*	FT/SSC/none	Permanent and semi-permanent freshwater habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation.	**Not Likely.** Perennial freshwater habitat is absent from the Study Area. There are no CNDDB records for this species in the vicinity of the Study Area.
			REPTILES	
Green turtle	*Chelonia mydas*	FT/none/none	Shallow water with sufficient submergent vegetation. Breeds on islands often but also on mainland sandy beaches.	**Absent.** Suitable habitat for this species does not occur in the Study Area.
Leatherback turtle	*Dermochelys coriacea*	FE/none/none	Marine, open ocean often near continental shelf. Nests on sloped sandy beaches often near deep water.	**Absent.** Suitable habitat for this species does not occur in the Study Area.
Loggerhead turtle	*Caretta caretta*	FT/none/none	Open ocean up to 500 miles off shore. Nests on sandy beaches seaward of well developed dunes.	**Absent.** Suitable habitat for this species does not occur in the Study Area.
Olive (=Pacific) ridley sea turtle	*Lepidochelys olivacea*	FT/none/none	Near shore less and 15 km. bottom dwelling sea turtle, nests on sandy beaches.	**Absent.** Suitable habitat for this species does not occur in the Study Area.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	FE/ST/FP	Inhabits ponds, streams, rivers, and reservoirs, typically with riparian or emergent vegetation. Requires upland areas for aestivation and nesting, usually within 100 yards of permanent water source.	**Not Likely.** Suitable habitat for this species does not occur in the Study Area. There are no CNDDB records for this species in the vicinity of the Study Area.
Western pond turtle	*Actinemys marmorata*	none/SSC/none	Typically inhabit ponds, slow-moving streams and rivers, irrigation ditches, and reservoirs with abundant emergent and/or riparian vegetation.	**Not Likely.** Suitable habitat for this species does not occur in the Study Area. There are no CNDDB records for this species in the vicinity of the Study Area.
			BIRDS	
Alameda song sparrow	*Melospiza melodia pusillula*	none/SSC/none	Tidal salt marsh habitats along the edge of the Bay and streams where tidal flow effects the vegetation.	**Low.** Salt marsh along Yosemite Slough and the HPS shoreline provides marginal habitat for this species due to its limited extent. Song sparrows were observed between January 2003 and April 2004 along Yosemite Slough, however it is unknown whether these were Alameda song sparrows.

[896] Jones and Stokes, *Biological Assessment for the Bayview Transportation Improvements Project*, June 2009.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
American peregrine falcon (nesting)	*Falco pergrinus anatum*	Delisted/SE (proposed delisted)/FP	Frequents bodies of water in open areas with cliffs and canyons nearby for cover and nesting. Known to nest on artificial substrates (bridges, buildings, etc)	**Known.** A pair of American Peregrine falcons was observed nesting in the Re-gunning crane on Parcel D of the HPS Phase II site. The pair has raised several young at this location.[897]
Bank swallow (nesting)	*Riparia riparia*	none/ST/none	Nests in steep sandy banks where it excavates burrows.	**Not Likely.** Although individuals have been observed in the vicinity, the Study Area does not provide suitable nesting habitat.
Barrow's goldeneye	*Bucephala islandica*	none/SSC/none	Breeds in high central & northern Sierra Nevada Mountains, near wooded mountain lakes or large streams. Nest in tree cavities, such as a deserted nest-hole of a pileated woodpecker or flicker; also use nest boxes.	**Known.** Although observed near the site during migration and winter, the Study Area does not provide suitable nesting habitat and is well outside the species' breeding range.
Bryant's savannah sparrow	*Passerculus sandwichensis alaudinus*	none/SSC/none	Frequents low tidally influenced habitats, adjacent to ruderal areas, moist grasslands within and just above the fog belt, and grasslands.	**Low.** Salt marsh along Yosemite Slough and the HPS shoreline provides marginal habitat for this species due to its limited extent. Savannah sparrows were observed between January 2003 and April 2004 along Yosemite Slough, however it is unknown whether these were Bryant's savannah sparrows.
Burrowing owl	*Athene cunicularia*	none/SSC/none	Found in open, dry grasslands, deserts, and ruderal areas. Requires suitable small mammal burrows.	**Known.** This species has been observed in the past on Candlestick Point and at HPS, and suitable foraging habitat is present on the site. Although suitable conditions for nesting are present, the species is not known to have nested on the site. Currently, it is either absent, or it occurs sporadically as a non-breeding visitor.
California black rail	*Laterallus jamaicensis coturniculus*	none/ST/FP	Inhabits tidal salt marshes bordering larger bays, or other freshwater and brackish marshes, at low elevations.	**Not Likely.** Small mats of pickleweed adjacent to brackish wetlands are too limited in extent and too highly disturbed to provide suitable habitat. Tidal zone is very narrow.
California brown pelican (rookery and communal roosts)	*Pelecanus occidentalis californicus*	FPD/SPD[898]/FP	Typically in littoral ocean zones, just outside the surf line; nests on offshore islands.	**Known.** This species was observed roosting on piers within the Study Area. However, suitable nesting habitat for this species does not occur in the Study Area. The Study Area is outside this species' current breeding range.

[897] Nelson, G., Facility Coordinator, Navy, field visit with PBS&J, July 8, 2008.
[898] California Department of Fish and Game (CDFG) news release: *Fish and Game Commission votes to remove California brown pelican from State Endangered Species List*. February 17, 2009.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
California clapper rail	*Rallus longirostris obsoletus*	FE/SE/FP	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickle-weed; feeds on mollusks removed from the mud in sloughs.	**Not Likely.** Suitable habitat does not occur in the Study Area. Salt marsh is highly disturbed and limited in the Study Area. Yosemite Slough is a tidal slough, but suitable habitat for the rail is absent because the existing salt marsh in Yosemite Slough is very narrow and unsuitable. The lack of tidal channels within those marshes, feeding into Yosemite Slough further reduce habitat quality.
California least tern (nesting colony)	*Sternula antillarum browni*	FE/ST/FP	Nests on sandy, upper ocean beaches, and occasionally uses mud flats; forages on adjacent surf line, estuaries, or the open ocean.	**Not Likely.** Suitable nesting habitat does not occur in the Study Area. Individuals may forage in the open water adjacent to the Study Area.
Common loon	*Gavia immer*	none/SSC/none	Nesting locations at certain large lakes & reservoirs in interior of state, primarily in northeastern plateau region. Bodies of water regularly frequented are extensive, fairly deep, and produce quantities of large fish.	**Known.** Although observed near the site during migration and winter, the Study Area does not provide suitable nesting habitat and is well outside the species' breeding range.
Harlequin duck (nesting)	*Histrionicus histrionicus*	none/SSC/none	Usually nests along shores of shallow, swift rivers with plentiful aquatic invertebrates.[899]	**Known.** This species was observed perching on the piers in the HPS Phase II site. However, the Study Area does not provide suitable nesting habitat for this species. The Study Area is outside this species' current breeding range.
Loggerhead shrike	*Lanius ludovicianus*	none/SSC/none	Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting. Typically nests in broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub, and wash.	**Known.** Non-native grasslands provide suitable foraging habitat. Loggerhead shrike has been observed by Alan Hopkins at the CPSRA.[900] Although suitable conditions for nesting are present, the species is not known to have nested on the site. Currently, it is either absent, or it occurs sporadically as a non-breeding visitor.
Marbled murrelet	*Brachyramphus marmoratus*	FT/SE/none	Mature, coastal coniferous forests for nesting; nearby coastal water for foraging; nests in conifer stands greater than 150 years old and may be found up to 35 miles inland; winters on subtidal and pelagic waters often well offshore.	**Absent.** Suitable habitat not present in the Study Area.

[899] California Department of Fish and Game (CDFG). Website: http://www.dfg.ca.gov/whdab/html/B096.html. Accessed April 6, 2005.
[900] Golden Gate Audubon Society, *Final Report Yosemite Slough Watershed Wildlife Survey 2003–2004*, prepared by LSA, July 27 2004.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
Northern harrier	*Circus cyaneus*	none/SSC/none	Coastal salt & fresh-water marsh. Nest & forage in grasslands, from salt grass in desert sink to mountain cienegas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	**Known.** Salt marsh and ruderal habitats provide suitable foraging habitat for this species, which has been observed by Alan Hopkins at the CPSRA.[901] However, suitable breeding habitat is absent due to the limited extent of marsh, human disturbance, and vulnerability of this ground-nesting species to predation.
San Francisco yellowthroat	*Geothlypis trichas sinuosa*	none/SSC/none	Inhabits emergent wetland habitat, and is a resident and summer visitor in the San Francisco Bay area. Nests are usually placed on or within 8 cm (3 inches) of ground; and may be positioned over water in emergent aquatic vegetation, dense shrubs, or other dense growth.	**Moderate.** Salt marsh along Yosemite Slough and the HPS shoreline provides potential habitat for this species. The existing salt marsh provides marginal habitat due to its limited extent. Common yellowthroats were observed between January 2003 and April 2004 along Yosemite Slough, however it is unknown whether these were San Francisco yellowthroats.[902]
Short-eared owl	*Asio flammeus*	none/SSC/none	Found in swamplands, both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	**Known.** Salt marsh and ruderal habitats provide suitable foraging habitat for this species, which has been observed by Alan Hopkins at the CPSRA.[903] However, suitable breeding habitat is absent due to the limited extent of marsh, human disturbance, and vulnerability of this ground-nesting species to predation.
Short-tailed albatross	*Phoebastria albatrus*	FE/none/none	Pelagic; nests on offshore islands in north Pacific.	**Absent.** Suitable habitat does not occur in the Study Area.
Tricolored Blackbird	*Agelaius tricolor*	none/SSC/none	Highly colonial species, most numerous in central valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, & foraging area with insect prey within a few km of the colony.	**Known.** Ruderal and developed areas on the site provide potential foraging habitat for this species, and the tricolored blackbird has been observed by Alan Hopkins at the CPSRA.[904] However, suitable nesting habitat is absent due to the lack of extensive freshwater marsh vegetation.
Vaux's swift	*Chaetura vauxi*	none/SSC/none	Redwood, Douglas fir, & other coniferous forests. Nests in large hollow trees & snags. Often nests in flocks. Forages over most terrains & habitats.	**Known.** Suitable nesting habitat does not occur in the Study Area. However, individuals may forage aerially over the Study Area.
Western snowy plover (nesting)	*Charadrius alexandrinus nivosus*	FT/SSC/none	Coastal beaches above the normal high tide line in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent.	**Not Likely.** Extensive, open sandy substrate to provide nesting habitat within the Study Area is absent.

[901] Ibid.
[902] Ibid.
[903] Ibid.
[904] Ibid.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*
White-tailed kite	*Elanus leucurus*	none/none/FP	Preferred habitat is marshes and waste fields in the Central Valley and coastal plains of California.	**Known.** Non-native grasslands provide suitable foraging habitat. Large trees in the Study Area provide suitable nesting habitat for this species, although the species is not known to nest there.
			MAMMALS	
Blue whale	*Balaenoptera musculus*	FE/none/none	Coastal and pelagic environments frequently found on the continental shelf off the California coast.	**Absent.** Suitable habitat does not occur in the Study Area.
Finback whale	*Balaenoptera physalus*	FE/none/none	Pelagic; usually found 25 miles or more off shore.	**Absent.** Suitable habitat does not occur in the Study Area.
Guadalupe fur seal	*Arctocephalus townsendii*	FT/ST/FP	Rocky insular shorelines and sheltered coves.	**Absent.** Suitable habitat does not occur in the Study Area.
Right whale	*Eubalaena glacialis*	FE/none/none	Pelagic, occurs mainly over continental shelf in the Pacific Ocean.	**Absent.** Suitable habitat does not occur in the Study Area.
Salt marsh harvest mouse	*Reithrodontomys raviventris*	FE/SE/FP	Salt marshes with a dense plant cover or pickleweed or fat hen; adjacent to an upland site.	**Not Likely.** Small mats of pickleweed adjacent to brackish wetlands and salt marsh habitat in the Study Area are highly disturbed. This species has not been recorded on the Peninsula north of the Foster City/ San Mateo Bridge area in decades.
Sei whale	*Balaenoptera borealis*	FE/none/none	Pelagic; generally in deep water along continental shelf.	**Absent.** Suitable habitat does not occur in the Study Area.
Sperm whale	*Physeter catodon*	FE/none/none	Pelagic; prefers deep water but is sometimes found around islands or in shallow shelf waters.	**Absent.** Suitable habitat does not occur in the Study Area.
Steller sea-lion	*Eumetopias jubatus*	FT/none/none Critical habitat	Near shore, pelagic when in water. Otherwise on shore, talus or bare rocks. Critical habitat has been defined for stellar sea lion as a 20 nautical mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas.[905]	**Not Likely.** Suitable habitat does not occur in the Study Area. Designated critical habitat does not occur in the Study Area. The closest designated critical habitat for this species is the Farallon Islands, approximately 33 air miles east of the Study Area.
Western red bat	*Lasiurus blossevillii*	none/SSC/none	Roosts primarily in trees, less often in shrubs, adjacent to streams, fields, or urban areas. Preferred roost sites are protected from above, open below, and located above dark ground cover.	**Moderate.** Trees (such as eucalyptus) provide potential roost sites for solitary migrant individuals.

SOURCE: CDFG Natural Diversity Database (CNDDB), July 2009 for the US Geological Survey's (USGS) 7.5-minute San Francisco South and Hunters Point quadrangles.
California Native Plant Society (CNPS), July 2009 for the USGS 7.5-minute San Francisco South and Hunters Point quadrangles.
US Fish and Wildlife Service (USFWS), July 2009 for the USGS 7.5-minute San Francisco South and Hunters Point quadrangles

[905] National Marine Fisheries Service (NMFS), *Designated Critical Habitat; Stellar Sea Lion*, 58 Federal Register 45269, 1993.

Table III.N-5 Special-Status Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Status[a] Fed/ CA/ other*	*Habitat and Seasonal Distribution in California*	*Likelihood of Occurrence Within the Study Area*

a. Status:

Federal

FE Federally listed as Endangered
FT Federally listed as Threatened
FC Federal candidate species
FPD Federally Proposed Delisted
SC National Marine Fisheries Service designated Species of Concern. Species of Concern status does not carry any procedural or substantive protections under the FESA.

State

SE State listed as Endangered
ST State listed as Threatened
SPD State Proposed for Delisting
SR State Rare
FP California Department of Fish and Game designated "Fully Protected"
SSC California Department of Fish and Game designated "Species of Special Concern"

Other

ESHA Environmentally Sensitive Habitat Area by the California Coastal Commission
SLC California Native Plant Society (CNPS) Ranking Species of Local Concern
1B California Native Plant Society (CNPS) Ranking. Defined as plants that are rare, threatened, or endangered in California and elsewhere.
2 California Native Plant Society (CNPS) Ranking. Defined as plants that are rare, threatened, or endangered in California, but more common elsewhere.
3 California Native Plant Society (CNPS) Ranking. Plants About Which More Information is Needed—A Review List.
CEQA Species not currently protected by statute or regulation, but considered rare, threatened or endangered under Section 15380 of the CEQA Guidelines.
Recent modifications to the CNPS Ranking System include the addition of a new Threat Code extension to listed species (i.e., List 1B.1, List 2.2 etc.). A Threat Code extension of .1 signifies that a species is seriously endangered in California; .2 is fairly endangered in California; and .3 is not very endangered in California.

b. Likelihood of occurrence evaluations

- A rating of "**Known**" indicates that the species/natural community type has been observed on the site.
- A rating of "**High**" indicates that the species has not been observed, but sufficient information is available to indicate suitable habitat and conditions are present in the Study Area and the species is expected to occur in the Study Area.
- A rating of "**Moderate**" indicates that it is not known if the species is present, but suitable habitat exists in the Study Area.
- A rating of "**Low**" indicates that species was not found during biological surveys conducted to date on the Project site and may not be expected given the species' known regional distribution or the quality of habitats located in the Study Area.
- A rating of "**Not Likely**" indicates that the taxon would not be expected to occur in the Study Area because the Study Area does not include the known range or does not support suitable habitat.
- A rating of "**Absent**" indicates that no recorded occurrences or suitable habitat(s) occur within the Study Area to support this species. These species are not discussed further in this document.

SECTION III.O PUBLIC SERVICES

III.O.1 Introduction

This section of the EIR discusses public services, including police protection, fire protection, schools, and libraries, and whether the Project would require new or expanded facilities to maintain acceptable service levels. If the population increase or development levels associated with the Project were to trigger a need for expansion or construction of new public facilities, this section analyzes whether the resulting physical changes could result in significant adverse environmental effects. In other words, an increase in staffing associated with public services or an increase in students would not, by itself, be considered a physical change in the environment; however, a physical change in the environment could result from the construction of new facilities or an expansion of existing facilities to accommodate the increased staff or students.

The EIR uses the most current information available since issuance of the Notice of Preparation for all of the public services analyzed in this section. The baseline conditions are identified under each public service category. This section identifies project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts. Analysis of emergency access to the Project site is provided in Section III.D (Transportation and Circulation).

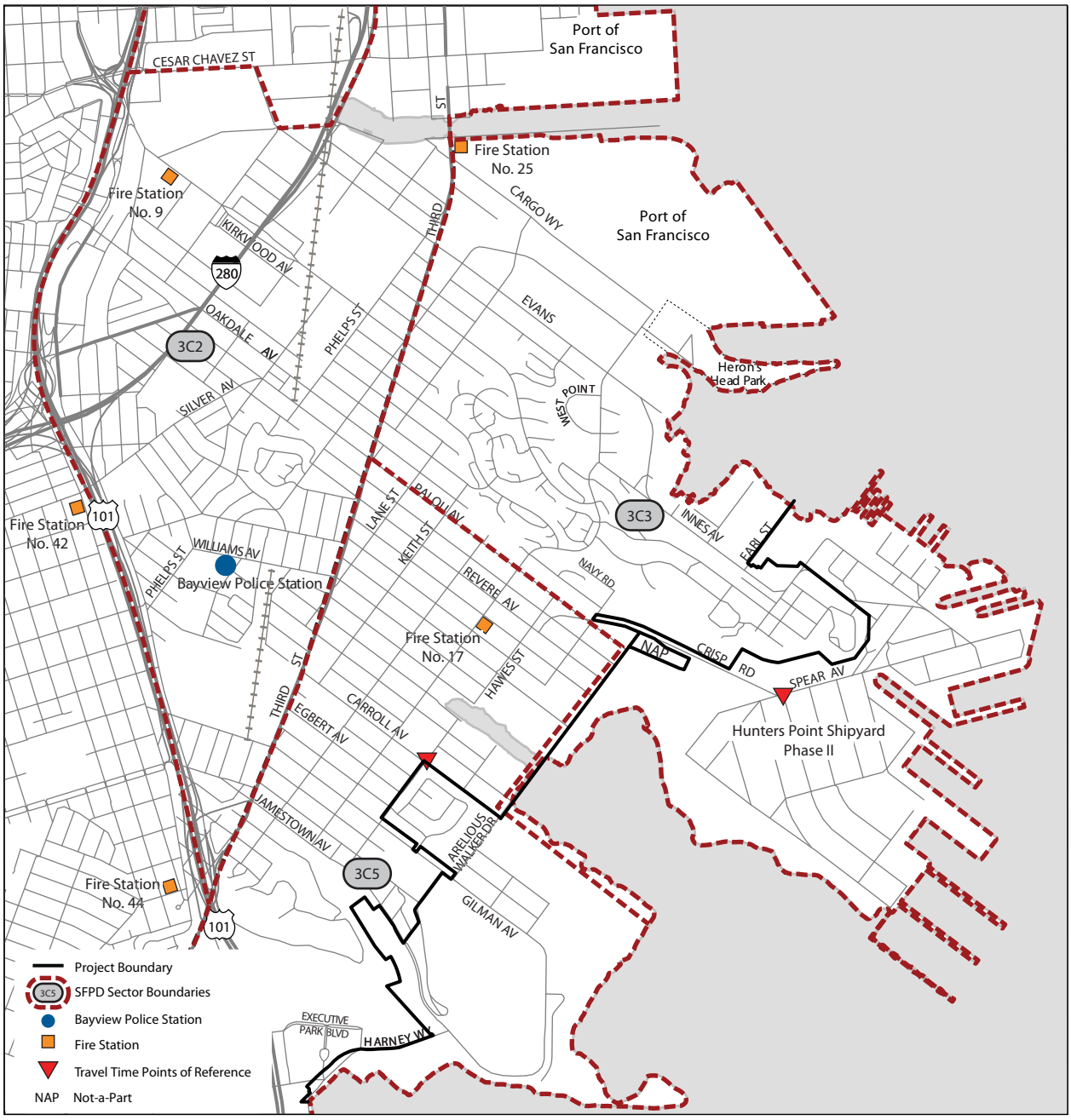
Police Protection

III.O.2 Setting

The San Francisco Police Department (SFPD) provides various public safety services in the City, including the Project site. These services include response to calls (reports of needs for police assistance), officer-initiated activity, traffic management, and general surveillance.

The Project site lies within the SFPD's Bayview District. Police services are provided from the Bayview Police Station, located at 201 Williams Avenue near Third Street. Police operating from this station provide service to the southeastern part of the City, extending along the eastern edge of McLaren Park to the Bay and south from Channel Street to the San Mateo County line. The Bayview District is one of the largest of San Francisco's ten police districts (covering about 18 percent of the City's land area). Refer to Figure III.O-1 (Southeast San Francisco Fire and Police Stations) for the SFPD station locations. The SFPD leases space on Parcel D-1 in Building 606 as a crime laboratory.

The Bayview District is currently divided into five sectors. The sectors are generally divided along Third Street, US-101 and other major roadways in the district. The two sectors that cover the Project site are located east of Third Street and extend from the San Mateo County line north to the Islais Creek channel and are generally divided north/south by Palou Avenue. The three remaining sectors are west of Third Street between Third Street and US-101, and generally divided north/south by Cesar Chavez Street and 24th Street. The last sector is located in the southwest quadrant of the intersection of US-101 and I-280 (Figure III.O-1).



SOURCE: Clement Designs, SFPD San Francisco Redevelopment Agency, PBS&J 2008.

PBS&J 10.31.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE III.O-1

SOUTHEAST SAN FRANCISCO FIRE AND POLICE STATIONS

Police Operations

Four basic activities account for police services: responding to citizens' requests for service; initiating activities designed to promote order and detect or deter criminal behavior; conducting administrative tasks; and engaging in community policing (attending community meetings; working with community groups, businesses, schools, and other government agencies to prevent and control crime violence and disorder; meeting informally with residents and business people; working on problem solving projects). An organizational assessment of the SFPD, completed in December 2008, recommended a structure for allocating patrol officers' time among those activities.[906] Findings from the study indicate that, in 2007, the proportion of time spent on calls for service varied between 30.0 percent and 50.7 percent among San Francisco's 10 police districts. Citywide, the average was 42.9 percent; in the Bayview District, it was 48.3 percent.

Current Police Activity

Criminal incidents recorded by the SFPD are organized according to the severity of the crime. Part I crimes include aggravated assault, arson, auto boosting, burglary, homicide, larceny, motor vehicle theft, rape, and robbery. Part II crimes range from carrying weapons to receiving stolen property; they include embezzlement, forgery, other (non-aggravated) assaults, disorderly conduct, sex offenses, and others. According to SFPD records, a total of 3,862 Part I crimes were reported in the Bayview District in 2007. These incidents accounted for approximately 9 percent of Citywide Part I crimes (43,690 incidents reported in total). A total of 4,991 Part II crimes were reported in the Bayview District in 2007, or about 11 percent of Citywide Part II crimes (46,822 incidents in total).[907] For comparison, based on the 2000 Census data,[908] the Bayview District accounted for approximately 8 percent of the total City population (60,301 residents in Bayview as compared with 774,385 San Francisco residents)[909] and about 18 percent of the City's land area.[910]

Response Time

The type of police response required varies according to the nature and urgency of the call. Calls for services are categorized as Priority A, B, and C. Priority A calls are of the highest priority, Priority B calls are second in priority, and Priority C calls are the third level of priority. The 2007 Citywide average response times were reported in the *San Francisco Police Department District Station Boundaries Analysis* (*Boundaries Analysis*), and are identified in Table III.O-1 (Citywide and Bayview District Response Times [Minutes]) below. From 2008 to 2009, the overall average response time in the Bayview District has improved and is better than the citywide averages identified in 2007. Incident response times can vary depending on the physical location of patrol vehicles and officers in the district and the proximity to reported incidents.

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[906] Police Executive Research Forum (PERF), *Organizational Assessment of the San Francisco Police Department: A Technical Report, Final Report*, December 2008.
[907] San Francisco Police Department, *2007 Annual Report*.
[908] While Section III.C (Population, Employment, and Housing) uses ABAG Projections, there is no comparable number for the "Bayview," thus Census data was used for this context.
[909] By 2005, the City population had grown to 783,441 according to 2005 population and households provided in a Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009. This still represents about eight percent of total City population.
[910] Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis*, p. 28, May 18 2008.

Incidents in progress and violent incidents require more immediate response than break-ins, acts of vandalism, or check scams that are discovered sometime after they occurred.[911] There are no adopted response time requirements for Priority A, B, or C calls.

Table III.O-1 Citywide and Bayview District Response Times (Minutes)

	2007 Citywide	*2008 Bayview*	*2009 Bayview*
Priority A	4:36	4:42	2:58
Priority B	8:02	8:31	6:28
Priority C	11:37	14:43	11:40

SOURCE: San Francisco Police Department (SFPD), Compstat-Bayview District, Response Times—June 2008 vs. June 2009 Dispatch to Arrival On-Scene, June 2009; Public Safety Strategies Group (PSSG), San Francisco Police Department District Station *Boundaries Analysis*, p. 44., May 18, 2008.

According to the SFPD 2007 Annual Report, the Bayview District received 6,148 Priority A calls, 10,784 Priority B calls, and 8,944 Priority C calls, for a total of 25,876 calls for service. In addition to calls for service, the Bayview District also dealt with a total of 110,781 on-view (i.e., on site) incidents that required an officer-initiated response.[912] In the Bayview District, pockets of increased police activity were identified directly north and west of HPS in the Hunters Point neighborhood, and in the Bayview and Potrero Hill neighborhoods.[913]

Incidents Associated with Type of Use

Land use and location affects the types of incidents that prompt calls for police assistance. Calls from residences can involve domestic disturbances, neighborhood disputes, burglaries, or drug sales, while calls from retail space can involve shoplifting and traffic incidents. Calls from office space can often involve burglaries (auto or personal items), and calls from entertainment uses depend largely on the type of tenants; busy nightclubs can have fights, and retail uses can have burglaries.[914]

The pattern of calls in existing retail areas provides an indication of the types of calls to expect in new retail areas. Call patterns near San Francisco Centre (the area within a 500-foot radius of Market and Fifth Streets in downtown San Francisco) and near Stonestown Galleria (the area within a half-mile radius of the retail center) are illustrative of the pattern associated with retail use. In 2007, the preponderance of calls centered on those retail concentrations related to larceny/theft (55 percent for San Francisco Centre and 37 percent for Stonestown). The second most frequent type of call was for non-criminal incidents (10 percent for San Francisco Centre and 7.4 percent for Stonestown).

As identified in the *Boundaries Analysis*, one factor impacting the demands for police services is personal and family income. In the Bayview District, similar to the Tenderloin, Mission, and Southern, Northern, and Central areas, which are areas that have 20 percent to 50 percent of the population living below the poverty level, there is a consistently recorded higher need for police services.[915]

911 PBSJ Meeting with SFPD on April 22, 2008.
912 San Francisco Police Department (SFPD), *2007 Annual Report*.
913 Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis*, p. 35, May 18, 2008.
914 PBSJ Meeting with SFPD on April 22, 2008.
915 Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis*, p. 29, May 18, 2008.

Staffing

In 2008, citywide, the Police Department had 2,449 budgeted positions for uniformed officers, of which 2,374 were filled, which represents approximately 97 percent of budgeted positions.[916] In 2005, the SFPD had a total of 2,033 sworn officers.[917][918]

Each of the City's ten district stations is staffed by members of the Patrol Division, which, together with the Traffic Division, make up the Field Operations Bureau. The Patrol Division, supported by Field Operations Bureau staff, is responsible for community policing throughout San Francisco by car and on foot. Bayview Station personnel include command staff, administrative officers, and patrol officers. In the first half of 2009, the staff of sworn officers at the Bayview Station ranged from 138 to 148 officers depending on new recruit levels and other variables.[919] Officers are assigned by sector, and the number of officers on patrol varies by shift, with the shifts staggered throughout the day; each sector in Bayview is staffed with 12 officers at all times.[920]

The SFPD also provides a "housing team" at the Alice Griffith public housing facility, which is located on the Project site. Citywide, housing teams are provided at each public housing facility.[921] In April 2009, the San Francisco Housing Authority (SFHA), in collaboration with the SFPD, implemented a Housing Liaison Program that provides supplemental law enforcement services to several large family developments, including the Alice Griffith public housing facility. Since the program was initiated in 2004 and covered select housing sites (not including Alice Griffith until 2009), the SFHA has experienced a reduction in violent crime.[922] The housing team at Alice Griffith consists of four officers; two per shift for two 12-hour shifts, seven days per week. During the shift officers must spend at least 50 percent of their time on foot, become involved with youth at the site, and officers are not called from their community policing assignments unless there is an emergency.[923] The presence of this housing team does not preclude the presence of a patrol car through the area, and the Bayview Station still responds to calls for service from the housing site if necessary.[924]

Additional officers are stationed in Candlestick Park on football game days, supplementing officers on regular duty assignments. The Bayview Station provides two officers to assist in traffic control and security

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916 PBSJ Meeting with SFPD on April 22, 2008.
917 Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis*, p. 44, May 18, 2008.
918 Although 2008 and 2009 staffing data are provided to identify trends, for the purpose of this section, 2005 data, including staffing levels, are used as the baseline to be consistent with Section III.C (Population, Housing, and Employment), which utilizes 2005 population and employment data to evaluate growth impacts associated with the Project.
919 Personal communication, John Loftus, Captain, Bayview District Station to Chad Mason, PBS&J, July 28, 2009.
920 PBSJ Meeting with SFPD on April 22, 2008.
921 The Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis, Final Report*, May 13, 2008.
922 San Francisco Housing Authority (SFHA), Resolution Authorizing the Executive Director to Enter Into a One year Memorandum of Understanding Between the San Francisco Housing Authority and the San Francisco Police Department for Supplement Law Enforcement Services in an Amount not to Exceed $650,000, April 13, 2009.
923 San Francisco Housing Authority (SFHA), Resolution Authorizing the Executive Director to Enter Into a One year Memorandum of Understanding Between the San Francisco Housing Authority and the San Francisco Police Department for Supplement Law Enforcement Services in an Amount not to Exceed $650,000, April 13, 2009.
924 PBSJ Meeting with SFPD on April 22, 2008.

during games. The balance of the coverage, generally from 18 to 22 off-duty officers, is assigned through the SFPD Homeland Security Unit. They are paid at overtime rates to work inside the stadium, patrol the parking lots, or assist with traffic control in the vicinity of the stadium. The cost of service is currently borne by the 49ers.[925]

Facilities

The Bayview Station opened in February 1997. The station is located about one mile west of Candlestick Point, and is about two miles from the northwest-most portion of HPS Phase II (refer to Figure III.O-1). The Bayview Station has approximately 16,000 square feet of interior space and an estimated 6,000-square foot surface parking lot.

A review of district police stations has recently been conducted as part of an evaluation of the boundaries of SFPD district stations. The *Boundaries Analysis* prepared by the Public Safety Strategies Group (PSSG) in 2008 made several relevant findings for this EIR analysis:

1. There is an immediate need for two new stations for the Central and Southern Districts, and the remaining eight stations [including the Bayview Station] do not meet the needs of effective police operations.
2. There are clear and longstanding areas of crime in the northeast and middle area of the City.
3. Workload distribution is not well balanced among the district stations.[926]

One of the results of the *Boundaries Analysis* is to recommend a 5-district system rather than the current 10 districts. While two new stations are identified as being needed in other areas of the City, the Bayview Station is identified for reorganization and reconfiguration to better utilize wasted and unused space and to provide structured parking to meet long-term operational needs and to accommodate additional officers.

According to the *Boundaries Analysis*, crime in the City is not associated with increases in population per se, or with increased commercial, entertainment, or office uses. Crime in the City has been remarkably stable for the 2002–2007 period, along with a stable number of police officers. New ways of policing are required in longstanding crime areas. [927]

III.O.3 Regulatory Framework

Federal

There are no federal police services regulations applicable to the Project.

State

There are no state police services regulations applicable to the Project.

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[925] PBSJ Meeting with SFPD on April 22, 2008.
[926] The Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis*, May 13, 2008.
[927] The Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis,* Table 2, p. 20, May 13, 2008.

Local

There are no local police services regulations applicable to the Project.

III.O.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to police services, but generally consider that implementation of the Project would have significant impacts if it were to:

O.a Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, [or the] need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection

Analytic Method

Impacts on police protection services are considered significant if an increase in population or development levels would result in inadequate staffing levels, response times, and/or increased demand for services that would require the construction or expansion of new or altered facilities that might have an adverse physical effect on the environment. A significant impact would occur if the Project generated the need for additional officers that could not be accommodated at the existing Bayview Station and would require the construction or expansion of a new facility in the Bayview District. This methodology for assessing impacts on police services was determined through interviews with SFPD staff, as well as communications with PSSG, a consulting firm hired by the SFPD to access facilities needs.

Additionally, the Project's potential contribution to cumulative land use impacts is evaluated in the context of existing, proposed, and reasonably foreseeable future development expected in the Project vicinity.

Construction Impacts

Impact PS-1: Police Protection during Construction

Impact PS-1 **Construction activities associated with the Project would not result in a need for new or physically altered facilities in order to maintain acceptable service ratios, response times, or other performance objectives for police protection. (Less than Significant with Mitigation) *[Criterion O.a]***

Construction activities could result in increased demand for police services if construction activities cause traffic conflicts requiring SFPD response. Access to the Project site during construction would be maintained by implementation of a construction management traffic plan (CMTP), as required by mitigation measure MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. The program would supplement and expand, rather than modify or supersede any manual, regulations, or provisions set forth by SFMTA, DPW or other City

departments and agencies. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the Bayview Hunters Point area would be implemented. These could include construction strategies, demand management strategies, alternate route strategies, and public information strategies.

Construction activities also could increase demand for SFPD services if the site is not adequately secured, providing increased opportunity for criminal activity. To ensure adequate site security, mitigation measure MM PS-1 would require the Project Applicant to provide security during project construction.

MM PS-1 *Site Security Measures During Construction. During site preparation and in advance of construction of individual buildings, fencing, screening, and security lighting shall be provided by the Project Applicant. During non-construction hours the site must be secured and locked, and ample security lighting shall be provided.*

Through implementation of the security measures required by mitigation measure MM PS-1, impacts to the SFPD would be considered less than significant.

Operational Impacts

Impact PS-2: Police Protection during Operation

Impact PS-2 **Implementation of the Project would not result in a need for new or physically altered facilities beyond those included as part of this Project in order to maintain acceptable service ratios, response times, or other performance objectives for police protection. (Refer to Sections III.D [Transportation and Circulation], III.H [Air Quality], III.I [Noise], III.J [Cultural Resources and Paleontological Resources], III.K [Hazards and Hazardous Materials], and III.M [Hydrology and Water Quality]) *[Criterion O.a]***

Evaluating the need for increased SFPD staff when new development is planned involves considering the size, location, and character of the new development. In most instances, development within San Francisco occurs within a fully developed and urban area, and the incremental increase in service area or service requirements associated with any one project is nominal.

However, in this instance, the Project site is mostly underutilized—portions of HPS are secured, and Candlestick Park stadium is quiet except for game days. The *Boundaries Analysis* shows that crime in the Bayview neighborhood is centered on Third Street at Palou and Third Street, south of Gilman. [928] The Project proposes development that would result in a new resident population of 24,465 (resulting from 10,500 housing units) and about 10,730 jobs (refer to Section III.C [Population, Housing, and Employment]). Based on the proposed development, the resident and worker population of the Project site at full build-out would be 35,195.[929] An increase in daytime population of about 34,000 at the Project

[928] The Public Safety Strategies Group (PSSG), *San Francisco Police Department District Station Boundaries Analysis,* Table 2, p. 20. May 13, 2008.

[929] Calculated as the combined total of a resident population of 24,465 and a worker population of 10,730. This is a conservative estimate since it is not likely that the entire resident population and daytime population would be on site at the same time. For this same reason, a separate calculation of the visitor population is not included, this would overestimate the potential daytime population.

site would require a different service delivery. Patrolling this new area and responding to calls would require at the least a redeployment of police services within the Bayview District, or within a wider area given the current recommendations for redistricting. With Mission Bay, a relatively recent example of a "city within a city," the SFPD are investigating a potential new location as their headquarters.[930]

Impacts on police protection services are considered significant if an increase in population or development levels would result in inadequate staffing levels (as measured by the ability of the SFPD to respond to call loads) and/or increased demand for services that would require the construction or expansion of new or altered facilities that might have an adverse physical effect on the environment.

To estimate personnel requirements for new projects, the SFPD considers the size of the incoming residential population and the expected or actual experience with calls for service from other potential uses of the site. Any potential increase in staffing at the SFPD Bayview Station would be expected to take place over time throughout the Project development period with the incremental addition of new housing and new non-residential building space and their occupancy.[931]

- From 2011 to 2017, demolition and abatement activities would occur on HPS Phase II as this is where most of the initial development would occur; the construction of a new 49ers stadium would occur between 2014 and 2017. Aside from earlier demolition and replacement of Alice Griffith housing, most construction at Candlestick Point would occur between 2017 and 2031. The first ten years of development would not see much of an increase in police requirements for service, as the 49ers stadium would replace similar uses on Candlestick Point. As addressed in Impact PS-1, security of the construction areas would be the responsibility of the Applicant. Between 2019 and 2032, as new residential and non-residential uses come online, there would be an increased need for police protection services.

  Although the City has no adopted staffing ratio, the existing "level of service" at the SFPD can be determined by comparing citywide police force staffing[932] to total City population (including both residents and workers). As shown in Table III.O-2 (Citywide Number of Police Officers and Estimated Project Site Demand), using a total City population for San Francisco of 1,351,469 and a police department staffing level of 2,033 in 2005 (consistent with population and employment data used in Table III.C-1 [Existing Population (2005)] and Table III.C-3 [Existing Employment (2005)] of Section III.C), a citywide ratio of 1 officer per 665 people was calculated.[933] This ratio when applied to the total projected resident and employee population of the Project site at build-out, results in a potential increase of 53 police personnel to provide a comparable level of service in the Bayview District. Refer to Table III.O-2.

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930 "Mission Bay May House Police Hub", San Francisco Examiner, February 24, 2009. Available at http://www.sfexaminer.com/local/Mission-Bay-may-house-police-hub-40203627.html.
931 PBSJ Meeting with SFPD on April 22, 2008.
932 Using a Citywide police force staffing number accounts for the mixed-use nature of the Project, which would include a substantial daytime and resident or nighttime population.
933 City population was calculated as a 2005 population of 799,302 plus 2005 employment of 552,167; refer to Table III.C-1 (Existing Population [2005]) and Table III.C-3 (Existing Employment [2005]) of Section III.C (Population, Housing, and Employment).

Table III.O-2 Citywide Number of Police Officers and Estimated Project Site Demand

		Population	*Police Officers*
Citywide (2005)			
Residents		799,302	
Employees		552,167	
	Total	***1,351,469***	***2,033***
Ratio (officer to population)		1:665	
Project (2029)			
Residents		24,465	
Employees		10,730	
	Total	***35,195***	***53***
Ratio (officer to population)		1:665	

SOURCE: The population and households data reported for San Francisco is 2005 data provided in a Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009.; SFPD 2005 total staffing: PSSG District Station *Boundaries Analysis*, 2008; Proposed population and employment: Section III.C (Population, Housing, and Employment).

The SFPD evaluates the need for additional officers by sector, and not station or district needs. The Project site is located in two of the five sectors within the Bayview District, both of which have been identified as high demand areas. While it is unlikely that 53 new officers would be needed at the outset of project development as development would occur over a 20-year time period, some redistribution of the police presence in the southeastern portion of the City would be warranted by Project development, as described above.

While staffing increases, in and of themselves, would not create a significant environmental impact, the construction of new facilities to serve the additional 53 police officers could create significant environmental impacts. Additional SFPD personnel of this magnitude (i.e., 53 officers) needed to serve the Project would require a station from which to operate. Even if the existing Bayview Station were to be reconfigured and if the existing civilian personnel who occupy the station were to be moved to another facility, the existing space would not be adequate to support 53 new police officers. The exact amount of space that would be needed has not yet been determined. However, using an estimate of 110 square feet per person,[934] the additional 53 police officers would require approximately 6,000 square feet of interior building space. Additional space would be required for staff and visitor parking. According to SFPD, there is limited excess capacity at the existing Bayview Station, and the station would not be able to accommodate all 53 of the additional police officers without the reconfiguration and expansion of the existing station or the construction of a new facility.[935] In addition, the current surface parking lot is not adequate for existing personnel. Structured parking could be provided on the existing parking site.

Currently, the SFPD has no plans for expansion of its Bayview Station. According to the *Boundaries Analysis*, Bayview Station is not among the priorities for replacement, expansion, improvement, or correction of current deficiencies. However, according to PSSG, there is a considerable amount of wasted or unused space

[934] The Bayview Station is similarly sized to the other stations in the City, each of which is targeted for reconfiguration, and is approximately 16,000 gsf, and the capacity is about 140 officers, resulting in about 114 sf per officer.
[935] Personal communication, John Loftus, Captain, Bayview District Station to Allison Wax, PBS&J, August 31, 2009.

at the Bayview Station that could be reconfigured to accommodate additional officers.[936] If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 square feet (sf) could be constructed within the Project site on land designated for community-serving uses. As part of the Project, up to 100,000 gross square feet (gsf) divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. These uses have been anticipated as part of the Project, and the impacts of their construction are evaluated in this EIR. As such, in the event that a new police facility (counter, storefront, or other configuration) should be constructed on the Project site, construction of the new facility has been addressed in this EIR. With the construction of a new facility or a suitable retrofitting or expansion of the Bayview Station, the SFPD would have ample space to accommodate the additional police officers needed to maintain the SFPD's existing level of service. This analysis assumes that staffing associated with the Project could be accommodated within the Project site.

Construction activities associated with the proposed public facilities, which could include a potential 6,000 square foot building space for new police officers, are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), Section III.J (Cultural Resources and Paleontological Resources), Section III.K (Hazards and Hazardous Materials), and Section III.M (Hydrology and Water Quality). Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[937]

- As the Project identifies community service use areas that could be used for police services, and as police services are not tied to a specific station, the SFPD would be able to maintain acceptable levels of police service during operation of the Project. While the development of the Project may require new or physically altered police facilities in order to maintain acceptable police services, the potential impacts associated with the construction of a new facility have been addressed in this EIR and would not require further environmental review. As such, no mitigation is required.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts associated with police protection is the City of San Francisco. The past and present development in the City is described in the Setting section of this chapter,

[936] PBSJ Meeting with SFPD on April 22, 2008.
[937] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process. The City of San Francisco provides public services within the City's boundaries.

Development of cumulative projects within the City of San Francisco would result in increased population and employment-generating uses, based on recent projections, and associated increased demand for police protection. The Planning Department routinely prepares projections for the purposes of analyzing impacts of plans and projects undergoing the environmental review process. The Planning Department's recently completed projections, capturing citywide growth expectations by 2030.[938] It should also be noted that the projections also took into account existing conditions and other major projects currently in various stages of the entitlement process, including Executive Park, Visitacion Valley, Hunters View, as well a Treasure Island, Park Merced projects, and the Project. Development projections estimate an increase of 61,814 households, 133,359 persons, and 195,010 jobs from 2005 to 2030, either the latest year for which projections have been formulated or the closest year to Project build-out for projections which extend in five-year increments beyond 2030, consistent with other projections in this EIR.

Citywide, the Police Department has 2,449 budgeted positions for uniformed officers, of which 2,374 are currently filled, which represents approximately 97 percent of budgeted positions. A review of district police stations has recently been conducted as part of an evaluation of the boundaries of SFPD district stations. The *Boundaries Analysis* report identifies improvement needs at most existing stations, noting that the stations are either at capacity or too small for the number of personnel assigned, storage is lacking, locker rooms are inadequate, and technology is outdated and/or non-existent. The report further identifies that most of the stations, despite being fairly new or updated, do not fully meet the needs of the SFPD.[939] Two stations (Central and Southern) are recommended for replacement. However, while the Police Department considers population growth projections in its annual budgeting process to determine equipment and staffing needs for the coming year, it is possible that cumulative growth in the City could exceed the capacity of existing or planned staffing and facility improvements, and could require construction of one or more stations, resulting in a significant impact.

The report does not identify the Bayview station for replacement, expansion, or improvement; correction of current deficiencies at this station is not among the priorities suggested in the *Boundaries Analysis* report. No specific Bayview station needs have been identified for early action. The report does identify the potential for reconfiguration of the existing station and provision of structured parking to meet long-term operational needs at the Bayview station. Project changes in residential and non-residential development levels and land use intensity would take place over a period of years and could, over time, potentially add to SFPD staffing needs. In particular, based on existing call levels to other commercial and retail centers in the City, the Project would be likely to result in an increased number of similar calls for service. As noted, above, an increase in the Bayview station staff to respond to demand from new development would be expected to take place throughout the development period with the addition of new housing units and new non-residential building space and their occupancy. Demand for increased staffing, in and of itself, would not constitute a significant environmental impact. The need for increased staffing, however, could lead to the need for expanded or replacement facilities. Inasmuch as the increased staffing demand could

[938] Correspondence from John Rahaim, Director of Planning, to SFPUC dated July 9, 2009.
[939] Ibid. May 13, 2008, pp. 20 and 27.

be accommodated by a reconfigured Bayview Station and/or a new facility within the Project site, construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[940] Therefore, because the Project would require new or physically altered police facilities in order to maintain acceptable police services, the Project would make a cumulatively considerable contribution to a potential significant cumulative impact on police services. The Project's cumulative impact would be significant.

Fire and Emergency Medical Services

III.O.5 Setting

The San Francisco Fire Department (SFFD) is responsible for protecting life and property throughout San Francisco from fires, natural disasters, and hazardous materials incidents, and by providing emergency medical services.[941] The SFFD has forty-three station locations distributed throughout the City of San Francisco.[942] Staffing at each station is determined based on the types of firefighting apparatuses each station maintains. Engines are staffed with one officer and three firefighters, and trucks are staffed with one officer and four firefighters. The terms "fire engine" and "fire truck" represent different types of fire fighting apparatus. Ambulances are staffed with one paramedic specialist who provide pre-hospital advanced medical and trauma care. Total daily staff for all SFFD stations is currently 315, and the current shift ratio for SFFD is 4.25 shifts per day in 2008.[943] Using this shift ratio and the number of daily staff, approximately 74 staff persons are on duty per shift throughout all of the City's 43 stations.

Of the 43 SFFD fire stations located throughout the City, five of these stations are located in southeast San Francisco. No SFFD stations are located within the Project site itself (refer to Figure III.O-1 for the SFFD station locations). Stations east of US-101 in this part of the City include the following:

- Station 9 is located at 2245 Jerrold Avenue between Napoleon Street and Upton Street

[940] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.
[941] San Francisco Fire Department Website, Mission Statement, The mission statement also includes fire prevention education and goals for the work environment. http://www.sfgov.org/site/sffd_index.asp.
[942] San Francisco Fire Department Website. Station Locations.
http://www.sfgov.org/site/sffd_page.asp?id=57819#stations (accessed on September 11, 2009).
[943] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.

- Station 17 is located at 1295 Shafter Avenue at the corner of Ingalls Street
- Station 25 is located at 3305 Third Street, between the bridge over the Islais Creek Channel and Cargo Way

Stations west of US-101 in this part of the City include the following:

- Station 42 is located at 2430 San Bruno Avenue between Silver Avenue and Silliman Street
- Station 44 is located at 1298 Girard Street at the corner of Wilde Avenue, about a half block west of San Bruno Avenue

The SFFD target response time goal for Code 1 (non-emergency) calls is 8 minutes, for Code 2 (non life-threatening fire and medical emergencies) calls the response time goal is 20 minutes, and for Code 3 (life-threatening fire and medical emergencies) calls, the highest response priority, the response time goal is 4.5 minutes.[944] When responding to Code 3 calls, responding vehicles use flashing lights and sirens and cross intersections against control lights. The SFFD is currently in the 90th percentile for attainment of all the department's response time goals. Target response times are considered in the planning and siting of new fire stations within San Francisco.[945]

Stations located east of US-101 respond to calls within the Bayview Hunters Point neighborhood. The stations west of the US-101 may also respond; however, the freeway creates an obstruction that makes access to areas east of the freeway more difficult from this location. For Station 42, the closest cross-freeway route is the Silver Avenue undercrossing. From Station 44, the Paul Avenue undercrossing is reached by going north on San Bruno Avenue to Mansell Street and then to Paul Avenue, or the Bayshore Boulevard/3rd Street overcrossing can be reached by going south on San Bruno Avenue to Bayshore Boulevard. Table III.O-3 (Fire Stations in Southeast San Francisco) lists the SFFD stations that serve the BVHP area and the Project site, and the primary fire and emergency medical services they provide.

Table III.O-3 Fire Stations in Southeast San Francisco

Station	*Location*	*Nearest Major Street*	*Paramedic Capable*	*Equipment*	*# of personnel per shift*
9	2245 Jerrold Ave.	Napoleon St.	Yes	Engine, Ladder Truck, Battalion Chief	10
17	1295 Shafter Ave	Ingalls St.	Yes	Engine, Ladder Truck	9
25	3305 Third St.	Cargo Way	Yes	Engine	4
42	2430 San Bruno Ave.	Silver Ave.	Yes	Engine	4
44	1298 Girard St.	San Bruno Ave.	Yes	Engine	4

SOURCE: SFFD. Captain Andy Zanoff, SFFD, personal communications to Mundie & Associates, May 2009; Anne Tam, SFFD, verbal communication with Allison Wax, PBS&J on September 2, 2009.

The number of personnel per shift depends on the equipment at each station. Fire engines require four staff per shift, ladder trucks require five staff per shift, Battalion Chief requires one staff per shift, and ambulances require one staff per day.

An engine carries one officer (a captain or a lieutenant) and three firefighters, one of whom is either a designated Emergency Medical Technician (BLS/basic life support) or a Paramedic (ALS/advanced life support).

944 Ibid.

945 Ibid.

Travel times from fire stations near the Candlestick Point and HPS Phase II sites for an ordinary driver are shown in Table III.O-4 (Access to Candlestick Point and HPS Phase II from Nearby Fire Stations). Because the travel time information presented in Table III.O-4 represents an estimated travel time for an ordinary driver, it is a conservative (i.e., high) estimate of response time for emergency vehicles. Unlike an ordinary driver, an emergency vehicle can stop other traffic by the use of emergency sirens and can pass through intersections with traffic signals at reduced speeds even when receiving a red signal indication. Therefore, the time required to travel to the Project site for an emergency would be reduced, and would be consistent with City response times.

Table III.O-4 Access to Candlestick Point and HPS Phase II from Nearby Fire Stations

Station	*Location*	*Miles from Candlestick Point*	*Estimated Minutes to Candlestick Point*	*Miles from HPS Phase II*	*Estimated Minutes to HPS Phase II*
9	2245 Jerrold Ave.	2.1	7	3.1	10
17	1295 Shafter Ave	0.4	1	2.0	8
25	3305 Third St.	2.1	6	2.5	8
42	2430 San Bruno Ave.	1.4	4	3.8	14
44	1298 Girard St.	**1.4**	4	3.4	12

SOURCE: Estimated distances and travel times were estimated by Mundie & Associates
a. Distances reported are from the indicated station to the Alice Griffith housing complex.

Water supply for fire suppression in San Francisco is provided by an auxiliary water supply system (AWSS). Water for the AWSS is distributed through a network of pipes drawing water from a collection of reservoirs and pumping stations throughout the City. The Project would extend the AWSS to the Project site. Refer to Section III.Q (Utilities) for additional detail about water infrastructure, including the AWSS.

III.O.6 Regulatory Framework

Federal

There are no federal fire protection regulations applicable to the Project.

State

California Fire Code

State fire regulations are set forth in Sections 13000, *et seq*. of the *California Health and Safety Code*, which include regulations concerning building standards (as also set forth in the *California Building Code*), fire protection and notification systems, fire protection devices (such as extinguishers and smoke alarms, high-rise building and childcare facility standards), and fire suppression training.

Local

San Francisco Fire Code

The *San Francisco Fire Code* incorporates by reference the *California Fire Code*, with certain local amendments. The *San Francisco Fire Code* was revised in 2007 to regulate and govern the safeguarding of life and property from fire and explosion hazards arising from the storage, handling, and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the occupancy of buildings and premises; and to provide for the issuance of permits, inspections, and other SFFD services; and the assessment and collection of fees for those permits, inspections, and services. The SFFD reviews building plans to ensure that fire and life safety is provided and maintained in the buildings that fall under its jurisdiction. SFFD plan review applies to all of the following occupancy types:[946]

- Assembly occupancies (including restaurants and other gathering places for 50 or more occupants)
- Educational occupancies (including commercial day care facilities)
- Hazardous occupancies (including repair garages, body shops, fuel storage, and emergency generator installation)
- Storage occupancies where potential exists for high-piled storage as defined by Fire Code
- Institutional occupancies
- High-rise buildings of all occupancies
- Residential Occupancies, such as hotels, motels, lodging houses, residential care facilities, apartment houses, small-and large-family day care homes, and R-1 artisan buildings (excluding minor residential repairs such as kitchen and bath remodeling and dry rot repair)
- All fire alarm and fire suppression systems

In coordination with the San Francisco Department of Building Inspection (DBI), the SFFD conducts plan checks to ensure that all structures, occupancies, and systems outlined above are designed in accordance with the *San Francisco Building Code*.

Section 511 (Local Fire Safety Feature Requirements) of the *San Francisco Fire Code* requires that buildings 200 feet or more in height must provide at least one elevator approved by the Fire Department for firefighter use under fire conditions. The section also requires that for buildings having floors used for human occupancy located more than 75 feet above the lowest level of Fire Department vehicle access, an air replenishment system shall be installed to provide a means for firefighters to refill air bottles for self-contained breathing apparatus (SCBA) through a permanently installed piping distribution system. The system shall be tested and maintained pursuant to the Fire Department Administration Bulletin.

III.O.7 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to fire services, but generally consider that implementation of the Project would have significant impacts if it were to:

[946] San Francisco Fire Department, *Plan Check,* 2009. http://www.sfgov.org/site/sffd_page.asp?id=57395.

O.b Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, [or the] need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives

Analytic Method

Impacts on fire protection services are considered significant if an increase in population or development levels would result in inadequate staffing levels, response times, and/or increased demand for services that would require the construction or expansion of new or altered facilities that might have an adverse physical effect on the environment. A significant impact would occur if additional calls anticipated to result from the Project could not be accommodated within SFFD's target Code 3 response time of 4.5 minutes. Code 1 and Code 2 is for non-emergency calls with a response time of 8 minutes and 20 minutes, respectively, and are not emergency-response related.

The SFFD's response time could be affected by inadequate staffing levels caused by increases in demand. An increase in population or development may result in the need for additional fire protection personnel. The methodology for assessing impacts on fire protection and emergency medical services was determined through interviews with SFFD staff, who reviewed projected response times and development intensities at the Project site against the SFFD's target Code 3 response time of 4.5 minutes to determine whether additional staffing and therefore new facilities would be needed to provide adequate future service.[947] This information was then applied to the Project's potential increase in response time.

Additionally, the Project's potential contribution to cumulative land use impacts is evaluated.

Construction Impacts

Impact PS-3: Fire Protection and Emergency Medical Services during Construction

Impact PS-3 **Construction activities associated with the Project would not result in a need for new or physically altered facilities in order to maintain acceptable response times for fire protection and emergency medical services. (Less than Significant with Mitigation) *[Criterion O.b]***

During construction of the Project, emergency access to the Project site would be maintained through compliance with the Construction Transportation Management Plan (CTMP) prepared for the Project, as required by mitigation measure MM TR-1. Compliance with the CTMP would ensure that access to the Project site is not obstructed during construction activities. The CTMP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. The program would supplement and expand, rather than modify or supersede any manual, regulations, or provisions set forth by SFMTA, DPW, or other City departments and agencies. A cohesive program of operational and demand

[947] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.

management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the Bayview Hunters Point area would be implemented. These could include construction strategies, demand management strategies, alternate route strategies, and public information strategies. As such, construction of the Project would not impact SFFD response times, nor would it require expansion of or replacement of SFFD stations. Impacts to the SFFD would be considered less than significant.

Operational Impacts

Impact PS-4: Fire Protection and Emergency Medical Services during Operation

Impact PS-4 **Implementation of the Project would not result in a need for new or physically altered facilities beyond those included as part of this Project in order to maintain acceptable response times for fire protection and emergency medical services. (Refer to Sections III.D [Transportation and Circulation], III.H [Air Quality], III.I [Noise], III.J [Cultural Resources and Paleontological Resources], III.K [Hazards and Hazardous Materials], and III.M [Hydrology and Water Quality]) *[Criterion O.b]***

The Project would add 10,500 residential units and substantially increase employment-generating uses, resulting in an employment population of 10,730. The increase in the residential and daytime population (for a total population of 35,195), combined with an increase in the intensity of physical development on the Project site, would result in new demand for fire protection and emergency medical services.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help to minimize demand for future fire protection services. In addition, all development, including high-rise residential buildings would be reviewed by DBI and the SFFD to ensure that structures are designed in compliance with the *San Francisco Fire Code*. Section 511.1 and Section 511.2 of the *San Francisco Fire Code* outlines specific requirements for high-rise (i.e., buildings above 200 feet) buildings, and would apply to the Project's proposed high-rise structures. All proposed structures exceeding 200 feet in height would be required to install at least one elevator approved by the Fire Department for firefighter use under fire conditions, and an air replenishment system would be required for buildings intended for human occupancy located more than 75 feet above the lowest level of Fire Department vehicle access. Plan review for structures at Candlestick Point and HPS Phase II for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services at the Project site. In addition, as noted above, development of the Project would also include expansion of the AWSS to provide water infrastructure for firefighting activities. Refer to Section III.P for additional detail about the available water supply at the Project site and the proposed water infrastructure improvements, including the AWSS.

Response Time

As stated in Section III.O.5 (Setting), Stations 44 and 17 provide primary response to the Project site. Three additional stations located nearby could also respond to calls for service. Travel times from fire stations near Candlestick Point and HPS Phase II for an ordinary driver are shown in Table III.O-4, although it is likely that the time traveled from any of these stations would be reduced for emergency vehicles. The SFFD strives to maintain an average response time for fire and medical emergencies of 4.5 minutes, which may not be attainable when emergency vehicles are dispatched to the HPS Phase II site from any of the five stations. Travel times to the HPS Phase II site could take between 8 to 14 minutes based on an ordinary driver; and travel time to the Candlestick Point site could take over 4.5 minutes from Station 9 and Station 25. This estimate is based on the existing street grid to present a conservative (i.e., high) estimate of travel time to the Project site, which would be substantially different under Project conditions.

Candlestick Point

The travel time information represents an estimated travel time that an ordinary driver might experience on routes from existing SFFD stations to points within the Project site. Unlike an ordinary driver, an emergency vehicle can stop other traffic by the use of emergency sirens and can pass through intersections with traffic signals at reduced speeds even when receiving a red signal indication. In addition, Project conditions would include new roadway improvements (refer to Chapter II [Project Description]) that would speed access through and within the Project site. Therefore, the estimated time it takes for emergency vehicles to access the Project site is conservative (i.e., high), and it is likely that the time traveled to the Project site for an emergency would be reduced compared to an ordinary driver, and could be significantly reduced.

Existing SFFD facilities in the Bayview neighborhood would provide adequate response times to most points on Candlestick Point. Access to Candlestick Point would be a key factor in the ability of the SFFD to provide adequate fire protection and emergency medical services to this site. Roads providing access to Candlestick Point include Gilman Avenue, Jamestown Avenue, and Harney Way. SFFD personnel have reviewed the Project and concluded that no additional fire stations would be needed to serve Candlestick Point alone and emergency service can be provided within the average response time of 4.5 minutes, as shown on Table III.O-4.[948] Emergency access to Candlestick Point on game days would be provided via three primary routes: on the Harney Way/Arelious Walker Drive route from the south, emergency vehicles would be allowed to use the BRT-only lane; on Palou Avenue from the west; and from Innes Avenue on the north. No new or physically altered fire or emergency medical facilities would be required in order to maintain an acceptable level of service.

HPS Phase II

As shown in Table III.O-4, portions of the proposed development at HPS Phase II would be at a distance from existing fire stations including those most proximate to the site (Stations 44 and 17), and could take from 8 minutes to 14 minutes to access HPS Phase II. The SFFD strives to maintain a Code 3 emergency response time of 4.5 minutes, which may not be accommodated due to the distance of the nearest station and HPS Phase II. As such, a new fire station located in closer proximity to the Project site would be

[948] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.

needed to ensure adequate response times for HPS Phase II. The SFFD does not consider response time to the furthest extent of the HPS Phase II site to be acceptable, given the density of proposed development and the distance for the nearest fire station.[949] SFFD staff concluded that a fire station would be needed at a site that would offer more rapid response to the HPS Phase II site. Initial SFFD recommendations for such a station included providing one engine (four staff), one truck (five staff), and one ambulance (staff requirements not indicated). Both Station 9 and Station 17 include one engine and one truck, and their approximate building size is 6,100 gsf and 6,000 gsf, respectively. Neither station includes an ambulance. A new approximately 6,000-gsf SFFD station (or larger if an ambulance were accommodated) could be accommodated on the Project site, on land designated for community-serving uses. As part of the Project, up to 100,000 gsf divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses.

These uses have been anticipated as part of the Project and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[950] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. With the construction of a new SFFD facility located in closer proximity to HPS Phase II, emergency response times would be reduced due to the reduced distance that dispatched vehicles would be required to travel to access the Project site.

Game Day Access

The 49ers football stadium would require particular consideration and planning to ensure that adequate access is provided during athletic or other events. Those events result in higher than typical traffic, and high volumes of traffic put emergency vehicles in competition with civilian cars for traffic lanes. An access network capable of clearing lanes for emergency vehicles when needed would alleviate this potential problem. Prior to construction of new land uses at HPS Phase II, review of access strategies for game day and non-game day scenarios would be required pursuant to the SFFD's plan review requirements.[951]

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[949] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.

[950] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

[951] San Francisco Fire Department, Plan Check website. http://www.sfgov.org/site/sffd_page.asp?id=57395 (accessed August 2009).

As described in the Candlestick Point-Hunters Point Shipyard Phase II Development Plan Transportation Study (CHS Consulting, Fehr & Peers, and LCW Consulting, October 2009), the Project calls for a new Traffic Management Center, to be staffed by City employees, to dynamically monitor and operate traffic signals along primary ingress and egress routes to efficiently move traffic into and out of the area prior to and after games. In addition, similar to existing conditions, traffic control officers would be stationed at key locations to ensure efficient traffic movements.

Similar to existing conditions, the majority of stadium bound traffic would use a portion of US-101 to access the project site on game days. Traffic from the south would predominantly use northbound US-101 and access the site via Harney Way, while traffic from the north would predominantly use southbound US-101 and I-280 and access the site via Cesar Chavez Street, Cargo Way, Evans Avenue, and Innes Street. Some trips to the site would use Bayshore Boulevard or Third Street to access the area via Carroll Avenue, Gilman Avenue and Ingalls Street.

Prior to and after games in the proposed stadium, special measures (similar to those in place for existing football games) would be taken to allow the site's circulation system to accommodate unique game day traffic flows. Prior to games, the site's roadways would be geared towards inbound flow and after games the roadways would be geared towards outbound flow.

Vehicles accessing the new stadium from the south would use Harney Way. Harney Way would be configured to provide four inbound lanes (to the stadium) and one outbound lane between US-101 and Arelious Walker Drive. Arelious Walker Drive, between Harney Way and Crisp Road would provide four inbound lanes. Crisp Road would provide seven inbound lanes between Arelious Walker Drive and the new stadium. The lane configurations would be reversed for post-game conditions. Vehicles accessing the new stadium from the south, would be routed as described above to Crisp Road, where it would be channeled to a Ring Road on the southern portion of the stadium. Access to the internal parking aisles would be from the Ring Road.

Vehicles accessing the new stadium from the north would use Evans Avenue and Cargo Way. These inbound routes would merge at Hunters Point Boulevard/Jennings/Evans. From there, the inbound route along Hunters Point Boulevard and Innes Avenue would provide four inbound lanes and one outbound lane. The lane configurations along Hunters Point Boulevard and Innes Avenue would be reversed for post-game conditions.

On the Harney Way/Arelious Walker Drive route, emergency vehicles would be allowed to use the BRT-only lanes (the BRT-only lanes break off from the primary auto route and continue on Harney Way, east of Arelious Walker Drive, and on Egbert before reconnecting with Arelious Walker Drive immediately south of the Yosemite Slough bridge). Emergency vehicles would also be allowed to use Palou Avenue, which would be transit-only on game days. Both of these routes would be free of congestion, and would offer emergency vehicle access between regional facilities and Crisp Road. Emergency vehicles would be able to enter the stadium parking lot via Crisp Road. Emergency vehicles would also be able to use Innes Avenue, as there would be at least one lane in each direction on this route open to traffic. However, since immediately following games the outbound direction may be congested, this may not be as desirable a route as the Harney Way BRT lanes or Palou Avenue.

Conclusion

Construction of a new SFFD facility on land designated for community-serving uses on the Project site would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. Construction of 100,000 gsf of community facilities, which could include a new SFFD facility, has been included as a component of the Project. Therefore, while the development of the Project may require new or physically altered SFFD facilities in order to maintain acceptable fire protection and emergency medical services, the potential impacts associated with the construction of a new facility have been addressed in this EIR and would not require further environmental review.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts associated with fire protection is the City of San Francisco. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process. The City of San Francisco provides public services within the City's boundaries.

Development of cumulative projects within the City of San Francisco would result in increased population and employment-generating uses, based on recent projections, and associated increased demand for police protection. The Planning Department routinely prepares projections for the purposes of analyzing impacts of plans and projects undergoing the environmental review process. The Planning Department's recently completed projections, capturing citywide growth expectations by 2030.[952] The projections also took into account existing conditions and other major projects currently in various stages of the entitlement process, including Treasure Island, Park Merced projects, and the Project. Development projections estimate an increase of 61,814 households, 133,359 persons, and 195,010 jobs from 2005 to 2030, either the latest year for which projections have been formulated or the closest year to Project build-out for projections that extend in 5-year increments beyond 2030, consistent with other projections in this EIR.

Development of cumulative projects within the City of San Francisco would result in increased population and employment-generating uses, based on recent Planning Department projections, and increased demand for fire and emergency medical services. This increase in demand would potentially affect response times, requiring the construction of new facilities. This would also include increased demand for water and potential improvements in conveyance systems for firefighting purposes. The SFFD target response time goal for Code 3 life-threatening fire and medical emergencies, the highest response priority, is 4.5 minutes. This target response time is considered in planning and siting of new fire stations within the City.

All cumulative projects would be built to *San Francisco Fire Code* standards, which would help to minimize demand for future fire protection services. All development, including high-rise residential buildings up to 40 stories, would meet standards for emergency access, sprinkler and other water systems, and other requirements specified in the *San Francisco Fire Code*. Standards pertaining to equipment access would also be met. Plan review for proposed structures for compliance with *San Francisco Fire Code* requirements, to

[952] Correspondence from John Rahaim, Director of Planning, to SFPUC dated July 9, 2009.

be completed by DBI and the SFFD, would minimize fire-related emergency dispatches, reducing the demand for fire protection services. New or physically altered fire or emergency medical facilities could be required in order to maintain acceptable levels of service from cumulative development, and expansion of the water conveyance system could also be required. Because it is unknown the extent to which such facilities and systems would require expansion and whether such improvements would accommodate projected growth, this is a potentially significant impact.

Existing SFFD facilities in the Bayview neighborhood would provide adequate response times to most points within the Project site. SFFD staff, reviewing considerations of development types and distances, concluded that a fire station would be needed at a site that would offer more rapid response to the Project site. Recommendations for such a station included providing one engine (four staff), one truck (five staff), and one ambulance (staff requirements not indicated), in an approximately 6,000-gsf building. The SFFD land could be accommodated on the Project site. Since adequate response times would be ensured for the Project through provision of a new fire facility, the construction of which is evaluated and mitigated for in this EIR, the Project would not make a cumulatively considerable contribution to any potentially significant cumulative impact on fire and emergency medical services. The Project's cumulative impact would be less than significant.

Schools

III.O.8 Setting

The San Francisco Unified School District (SFSUD) oversees the public school system in San Francisco (K–12). The SFUSD is comprised of 37 preschools and 104 schools serving various grade levels (K–5, K–8, and 9–12). Based on data for the 2008/09 school year, there are approximately 56,000 students currently attending public schools in San Francisco (refer to Table III.O-5 [Existing Classroom Capacity and Enrollment, SFUSD, 2008]).[953] It is estimated that another 20,000 students, 26 percent of the total enrollment, attend local private schools. Over the past decade, student enrollment in the SFUSD has been declining by approximately 0.1 percent annually.[954]

SFUSD is the primary public school provider in the City, accommodating approximately 98 percent of the total public school enrollment. Additional public school facilities include court-sponsored facilities (correctional institutions, court ward facilities, etc.) and public charter schools.

[953] Public school attendance based on: California Department of Education, *2008–09 District Enrollment by Grade, San Francisco Unified*, Educational Demographics Unit, DataQuest System, 2009. http://data1.cde.ca.gov/dataquest (accessed online July 6, 2009). The 2005 American Community Survey reported that public school attendance represents approximately 74 percent of the total school attendance in San Francisco, while private school attendance represents 26 percent of the total.

[954] California Department of Education, *DataQuest*, http://data1.cde.ca.gov/dataquest/ (accessed July 2009).

Table III.O-5 Existing Classroom Capacity and Enrollment, SFUSD, 2008

Type of School	*Number of Schools*	*Capacity*	*2008/09 Enrollment*
Elementary Schools	63	29,260	24,939
Middle Schools	13	11,700	11,816
High Schools	16	17,575	19,688
Alternative Schools (varying grade levels)	10	3,900	—
Public Charter Schools (varying grade levels)	2	1,400	—
Total	***104***	***63,835***	***56,443***

SOURCE: San Francisco Unified School District, *San Francisco Unified School District Capital Plan FY 2009–2018*, Appendix; California Department of Education, 2009. Educational Demographics Unit, Data Quest System: 2008–09 District Enrollment by Grade, San Francisco Unified, 2008. http://data1.cde.ca.gov/dataquest (accessed: July 6, 2009).

As shown in Table III.O-5, there is capacity for approximately 63,835 students in existing SFUSD facilities.[955] Table III.O-5 presents an estimate of existing public school enrollment for those schools. Although neighborhoods with a high population of school-age children generate a proportionally high level of demand for nearby schools, SFUSD assigns students to schools based on a lottery system. This system ensures that student enrollment is distributed to facilities that have sufficient capacity to adequately serve the educational needs of students. The SFUSD provides bus transportation to students who attend schools outside of the neighborhood in which they reside.[956]

With enrollment declining in the District, SFUSD has been closing schools. The SFUSD's capital facilities program has focused on replacing older schools and modernizing other facilities. The *San Francisco Unified School District Capital Plan* identifies a range of physical improvements necessary to modernize existing facilities, such as providing access compliant with the Americans with Disabilities Act (ADA), upgrading science and computer labs, expanding arts facilities, and other improvements. In addition, the SFUSD has a backlog of deferred maintenance needs.

Project Vicinity

Schools located in the vicinity of the Project site covering grades K–12 are listed in Table III.O-6 (San Francisco Unified School District Facilities in the Project Vicinity). Schools in the vicinity of the Project site are generally in the Bayview neighborhood, but also include facilities to the north in the Mission neighborhood and to the west in the Visitacion Valley neighborhoods. During the 2008/09 school year, those schools in the Project vicinity had a combined enrollment of 2,980 students and an existing capacity of 5,900 spaces. Public school locations in the Project vicinity are illustrated in Figure III.O-2 (Southeast San Francisco Schools and Libraries).

[955] San Francisco Unified School District, *San Francisco Unified School District Capital Plan FY 2009–2018*, Appendix, 2008.
[956] San Francisco Planning Department and Redevelopment Agency, *Visitacion Valley Redevelopment Program Final Environmental Impact Report*, Section 14 Public Services, p. 14-6, December 2008. A copy of this document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Table III.O-6 San Francisco Unified School District Facilities in the Project Vicinity

Facility	*2008/09 Capacity*[a]	*2008/09 Enrollment*[b]	*2008/09 Remaining Capacity*	*Percentage of Capacity Remaining*
Bret Harte Elementary (K–5)	500	261	239	48%
Malcolm X Academy Elementary (K–5)	500	118	382	76%
Dr. George Washington Carver Elementary (K–5)	500	266	234	47%
Dr. Charles R. Drew Elementary (K–3)	600	267	333	56%
Willie L. Brown Jr. Elementary (K–5)	325	221	104	32%
Subtotal Elementary Schools	*2,425*	*1,133*	*1,292*	*53%*
Dr. Martin Luther King Jr. Middle School (6–8)	525	500	25	5%
Horace Mann Middle School (6–8)	825	330	495	60%
Visitacion Valley Middle School (6–8)	850	306	544	64%
Subtotal Middle Schools	*2,200*	*1,136*	*1,064*	*48%*
Thurgood Marshall High School (9–12)	1,275	712	563	44%
Subtotal High Schools	*1,275*	*712*	*563*	*44%*
Total	***5,900***	***2,981***	***2,919***	***49%***

SOURCES:
a. SFSUD, Capital Plan, 2009–2018, September 2008.
b. California Department of Education Educational Demographics Unit, 2008–09 District and School Enrollment by Grade, San Francisco Unified School District, 2009.

Under existing conditions, there are approximately 43 school-age children living at the Project site, representing a small percentage of overall SFUSD enrollments. The remaining capacity in the 2008/09 school year to accommodate additional enrollment within the Bayview neighborhood include approximately 1,292 elementary, 1,064 middle school, and 563 high school students (Table III.O-6). As shown in Table III.O-6, schools in the vicinity of the Project site have adequate capacity to serve existing enrollment. The total remaining capacity of those facilities during the 2008/09 school year was approximately 49 percent.

III.O.9 Regulatory Framework

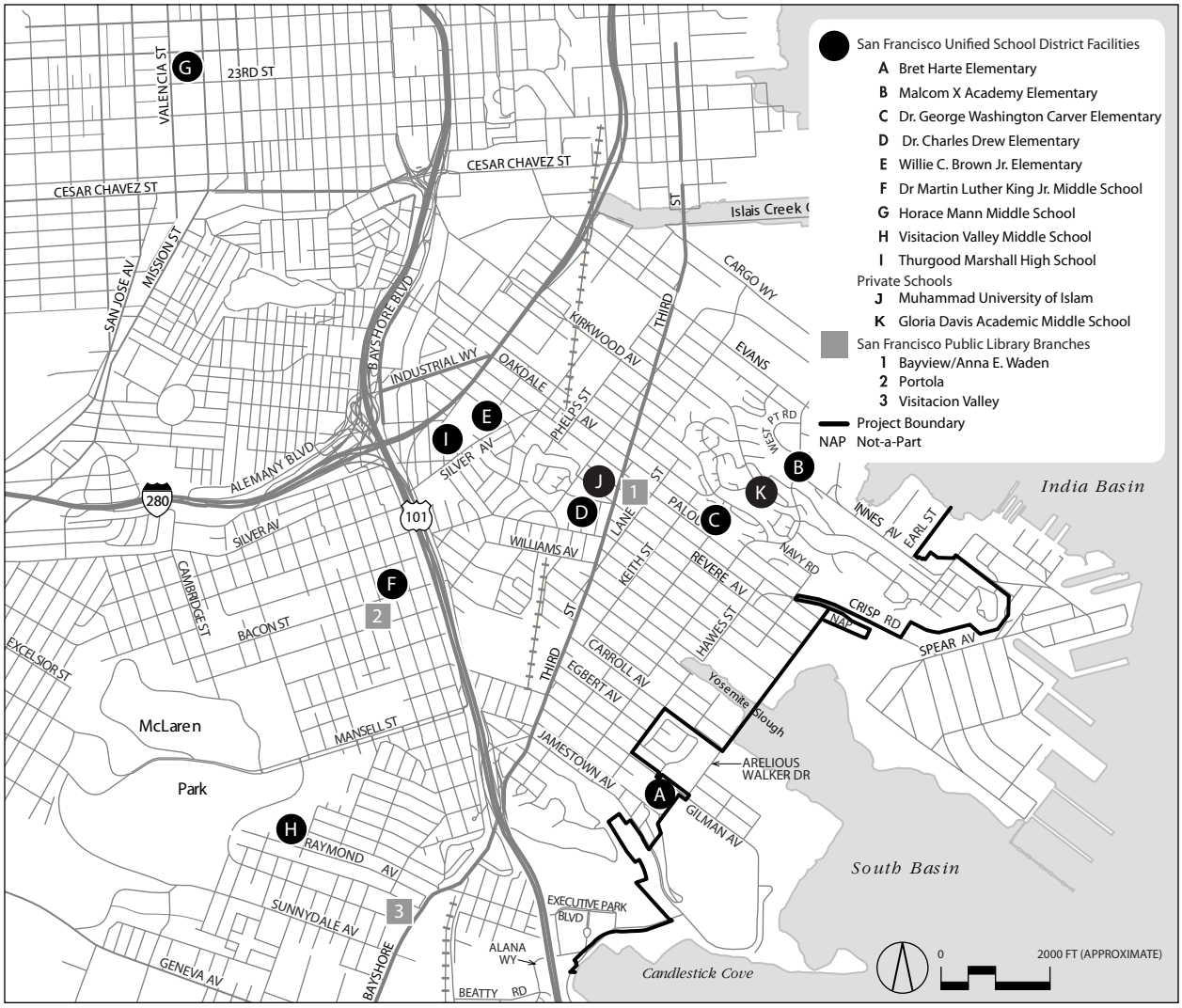
Federal

There are no federal school regulations applicable to the Project.

State

California Senate Bill 50 (SB 50)

The major source of school construction and modernization was the State School Construction Program until the passage of Senate Bill 50 (SB 50) and Proposition 1A, both of which passed on November 3, 1998. SB 50 and Proposition 1A provided a comprehensive school facilities financing and reform program, which authorized a $9.2 billion school facilities bond issue, as well as school construction cost containment provisions



SOURCE: San Francisco Redevelopment Agency, Clement Designs, PBS&J, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE III.O-2

Candlestick Point — Hunters Point Shipyard Phase II EIR

SOUTHEAST SAN FRANCISCO SCHOOLS AND LIBRARIES

and an eight-year suspension of the *Mira*, *Hart*, and *Murrieta* court cases. The provisions of SB 50 prohibit local agencies from denying either legislative or adjudicative land use approvals on the basis that school facilities are inadequate and reinstate the school facility fee cap for legislative actions (e.g., general plan amendments, specific plan adoption, zoning plan amendments), as was allowed under the *Mira*, *Hart*, and *Murrieta* court cases.[957] According to *Government Code* Section 65996, the development fees authorized by SB 50 are deemed to be "full and complete school facilities mitigation." The legislation also recognized the need for the fee to be adjusted periodically to keep pace with inflation. These provisions are in effect and will remain in place as long as subsequent state bonds are approved and available. As a result of this legislation, school districts would continue to levy a school fee under existing rules (*Government Code* Sections 65995, 65995.5, and 65995.7).

Local

SFUSD School Impact Fees

The SFUSD began collecting State-authorized school impact fees in 1987, which are collected to mitigate impacts associated with enrollment growth (e.g., new residential development). The SFUSD collects fees for all construction and building permits issued within the City. Developer fee revenues are used, in conjunction with other SFUSD funds, to support efforts to complete capital improvement projects.[958] Table III.O-7 (San Francisco Unified School District Adopted School Impact Fees) presents the current fees for new construction, by facility type, when building permits are issued.

Table III.O-7 San Francisco Unified School District Adopted School Impact Fees

Development Type	*Fee per Square Foot*
Residential	$2.24
Office	$0.27
Research and Development	$0.24
Hospitals	$0.22
Industrial/Warehouse/Manufacturing	$0.21
Retail and Services	$0.18
Lodging/Hotel/Motel	$0.09

SOURCE: SFUSD, Personal communication SFUSD Real Estate Department, to Chad Mason, PBS&J, July 28, 2009.

[957] There are a series of appellate decisions known as "Mira/Hart/Murrieta." In *Mira Development Corp. v. City of San Diego* (Mira), 205 Cal. App. 3d 1201 (1988); *William S. Hart Union High School District v. Regional Planning Commission* (Hart), 226 Cal. App. 3d 1612 (1991); and *Murrieta Valley Unified School District v. County of Riverside* (Murrieta), 228 Cal. App. 3d 1212 (1991), the courts held that the limitations of the School Facilities Law of 1986 only applied to municipalities when they made adjudicative decisions (such as approvals of parcel maps, use permits, and building permits) but not when they made legislative decisions (such as general plan amendments, zoning changes, and development agreements). Coalition for Adequate School Housing, *Senate Bill 50 and School Facility Fees A Report.* http://www.cashnet.org/resource-center/resourcefiles/71.pdf.

[958] San Francisco Unified School District, 2009–2010 Budget Proposal, Overview of San Francisco Unified School District and San Francisco County Office of Education. http://portal.sfusd.edu/data/budget/FY_2009-10_BudgetProposal.pdf (accessed: July 11, 2009).

III.O.10 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to school services, but generally consider that implementation of the Project would have significant impacts if it were to:

O.c Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, [or the] need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives of the school district

Analytic Method

Impacts on schools are determined by analyzing the estimated increase in student population as a result of Project build-out in 2032 and comparing the increase to the capacity of schools in 2030, the closest year to Project build-out for which housing projections have been calculated, to determine whether new or altered facilities would be required, the construction of which could result in substantial adverse environmental effects.

Additionally, the Project's potential contribution to cumulative school impacts is evaluated.

Construction Impacts

Impact PS-5: School Services during Construction

Impact PS-5 **Construction activities associated with the Project would not affect the provision of school services by decreasing access to school services. (No Impact) *[Criterion O.c]***

Construction of the Project would not result in impacts to the SFUSD system, as construction of the Project would not itself create new residents or students. Also, no SFUSD facilities are located on the Project site. All school services would be available to the community throughout the duration of project construction. As such, no impact to school services during construction of the project would occur. No mitigation is required.

Operational Impacts

Impact PS-6: School Services during Operation

Impact PS-6 **New students associated with implementation of the Project would not require new or expanded school facilities, the construction of which could result in substantial adverse impacts. (Less than Significant) *[Criterion O.c]***

The California Department of Education estimates that one dwelling unit would generate an average of 0.7 students, consisting of 0.5 elementary or middle school students and 0.2 high school students.[959] These

[959] San Francisco, *Eastern Neighborhoods Community Rezoning and Area Plans Final Environmental Impact Report*, August 2008, Initial Study p. 42. This report is on file as part of Case No. 2004.0160E and available for public review at the Planning Department, 1650 Mission Street, Suite 400.

rates are a result of statewide sampling that incorporates widely varying dwelling unit types, households, and other demographic characteristics and are routinely used by school districts that have not developed rates for their local jurisdictions.[960] However, those rates do not reflect demographic characteristics of San Francisco, which has fewer children per household than most communities. Therefore, for planning purposes, the SFUSD uses a student generation rate of 0.203 students (including elementary, middle, and high school students) per new housing unit.[961] The number of students generated by the Project was determined by multiplying the number of Project housing units by the student generation factor of 0.203. The number of students was distributed evenly by grade.

Table III.O-8 (Project Buildout Public School Enrollment Compared to SFUSD Capacity) presents the student enrollment that would be generated as a result of the Project, based on generation rates used by the SFUSD. While 26 percent of the total school-age children in San Francisco now attend private schools,[962] Table III.O-8 conservatively assumes that 100 percent of the school-age children associated with the Project would attend public schools.

Table III.O-8 Project Buildout Public School Enrollment Compared to SFUSD Capacity

Analysis Area	*Elementary School (Grades K–5)*	*Middle School (Grades 6–8)*	*High School (Grades 9–12)*	*Total*
Candlestick Point[a]	735	368	490	1,593
HPS Phase II[b]	248	124	166	538
Total	***983***	***492***	***656***	***2,131***
2030 Citywide Enrollment[c]	33,036	16,518	22,024	71,573
2008 SFUSD Capacity[d]	29,260	11,700	17,575	63,835
2030 Citywide Shortfall	3,776	4,818	4,449	7,738

SOURCE: ABAG Projections 2007; PBS&J, 2009.

The number of new students in the Project site was determined by multiplying the number of proposed housing units by the student generation factor of 0.203. The number of students was distributed evenly by grade.

a. For Candlestick Point, 7,850 residential units multiplied by 0.203 SFUSD student generation rate would result in 1,594 students. 1,594 students divided by 13 grade levels would result in 123 students per grade. 123 students per grade level multiplied by six grade levels for elementary school equals 735; multiplied by three grade levels for middle school equals 368; and by four grade levels for high school equals 490. Totals may not equal due to rounding.

b. For HPS Phase II, 2,650 residential units multiplied by 0.203 SFUSD student generation rate would result in 538 students. 538 students divided by 13 grade levels would result in 41 students per grade. 41 students per grade level multiplied by six grade levels for elementary school equals 248; multiplied by three grade levels for middle school equals 124; and by four grade levels for high school equals 166. Totals may not equal due to rounding.

c. 2030 enrollment was calculated as follows: the 2008/09 SFUSD enrollment was divided by the 2005 Citywide school-age population (5–19 years old), which yields a ratio of 0.558. Similarly, the 2030 Citywide school-age population (5–19 years old) was multiplied by the ratio of 0.558 to yield a projected 2030 SFUSD enrollment of 71,573. Enrollment was distributed evenly across the grade levels. Totals may not equal due to rounding.

d. The total includes capacity for 5,300 students in varying grade levels in alternative schools and public charter schools.

[960] San Francisco, *Eastern Neighborhoods Community Rezoning and Area Plans Final Environmental Impact Report*, August 2008, Initial Study p. 42. This report is on file as part of Case No. 2004.0160E and available for public review at the Planning Department, 1650 Mission Street, Suite 400.

[961] San Francisco, *Eastern Neighborhoods Community Rezoning and Area Plans Final Environmental Impact Report*, August 2008, Initial Study p. 42. This report is on file as part of Case No. 2004.0160E and available for public review at the Planning Department, 1650 Mission Street, Suite 400.

[962] US Census Bureau, American FactFinder, *2005–2007 American Community Survey 3-Year Estimates: County of San Francisco*, 2005. http://factfinder.census.gov (accessed online July 6, 2009).

As shown in Table III.O-8, a total of approximately 2,131 school-age children would live within the Project site following full build-out of the Project. Currently, at Candlestick Point, there are approximately 43 students associated with the Alice Griffith public housing site. After build-out of the Project, there would be approximately 1,593 school-age children living at Candlestick Point. There are currently no students at the HPS Phase II site. After build-out of the Project, there would be approximately 538 total students at the HPS Phase II site.

Comparing the 2008 SFUSD school capacity of 63,835 to a projected 2030 population of 71,573 school age children (recognizing that Project occupancy is projected to occur two years later, in 2032), there is a projected shortfall of about 7,738 seats Citywide, or about a 12 percent shortfall.

As discussed in Section III.O.2 (Setting), improvements are planned for many SFUSD schools, such as replacing older schools and modernizing other facilities. The *San Francisco Unified School District Capital Plan* identifies a range of physical improvements necessary to modernize existing facilities, such as providing access compliant with the *Americans with Disabilities Act* (ADA), upgrading science and computer labs, expanding arts facilities, and other improvements. Those improvements will improve accessibility, add new laboratories, provide better access to computing technology, and provide other advantages over existing facilities. While there are no plans to reduce school capacity at the Project site, in the event that schools located in the Project site reach capacity by the year 2032 (or 2030 as the projections indicate), either due to a reduction in space or an increase in classroom size, the SFUSD may assign students to schools based on a lottery system, which would ensure that student enrollment is distributed to facilities that have sufficient capacity to adequately serve the educational needs of students.

The analysis takes into consideration court decisions that have held that increased enrollment resulting in school overcrowding is considered a "social" rather than a physical environmental impact and is not, in itself, a significant environmental impact requiring mitigation under CEQA (*Goleta Union School District vs. Regents of University of California* [2d Dist. 1995]).[963] Instead, increased school enrollment may only lead to such an impact if the increase would ultimately require physical changes in the environment. Changes such as shifting students to other facilities, beginning year-round schools, and increasing the use of portable classrooms would be considered "social" effects, whereas a condition of present overcrowding and projections of increasing enrollments, which would likely necessitate constructing a new school, changing bus routes, and altering traffic patterns, could be considered "physical" effects. Also, state *Government Code* Sections 65995 and 65996 have pre-empted and limited the ability of cities to exercise their power to mitigate school impacts. The duty of a lead agency to mitigate school impacts beyond State-mandated fees can occur only when a physical environmental effect beyond the mere addition of students to a school occurs. Residential growth within the City over the next 30 years would be addressed by payment of SB 50 fees, and consequently school capacity may have improved by the time Project students are generated. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts

[963] California Natural Resources Agency, *CEQA Court Cases Decided in 1995*. http://ceres.ca.gov/ceqa/cases/1995/goleta95.html.

(either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[964]

Further, SFUSD could choose to address its potential future shortfalls in capacity through a wide range of options, including shifting students to other facilities, beginning year-round schools, and/or increasing the use of portable classrooms. While schools in the Project vicinity have approximately 49 percent capacity remaining in 2008/09, it is likely that a 12 percent Citywide overcapacity of SFUSD as a result of citywide population growth in 2030 would occur. The school impact fees paid pursuant to SB 50 would go toward maintaining or improving school facilities to accommodate growth in school attendance. Therefore, SB 50 would ensure that future facilities are provided, and this impact is considered less than significant. No mitigation is required.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts associated with schools is the City of San Francisco. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process. The City of San Francisco and the San Francisco Unified School District provide public services within the City's boundaries. SFUSD is the primary public school provider in the City, accommodating approximately 98 percent of the total public school enrollment. Additional public school facilities include court-sponsored facilities (correctional institutions, court ward facilities, etc.) and public charter schools. As shown in Table III.O-4 there is capacity for approximately 63,835 students in existing SFUSD facilities.

Development of cumulative projects within the City would result in increased population and employment-generating uses, which would result in an associated increase in the number of students to be served by the SFUSD. Over the past several years, the student population has declined, and some schools have been closed, and, as noted, the SFUSD is concentrating its efforts on replacing older schools and modernizing other facilities. The SFUSD began collecting State-authorized school impact fees in 1987, which are collected to mitigate impacts associated with enrollment growth (e.g., new residential development). The SFUSD collects these fees for all construction and building permits issued within the City. Developer fee revenues are used, in conjunction with other SFUSD funds, to support efforts to complete capital improvement projects. According to *Government Code* Section 65996, the development fees authorized by SB 50 are deemed to be "full and complete school facilities mitigation." Therefore, cumulative development within the City would not result in a significant schools impact. The Project's cumulative impact would be less than significant.

[964] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

Libraries

III.O.11 Setting

The San Francisco Public Library (SFPL) operates the Main Library at the Civic Center and 28 neighborhood branches distributed throughout San Francisco, providing information in books, other print and non-print formats, or electronic form. The SFPL is dedicated to providing "free and equal access to information, knowledge, independent learning, and the jobs of reading" for San Francisco.[965] During the 2007/08 fiscal year, the main library's collection was 1,297,853 volumes, and all the branch libraries had a collection of 1,203,126 volumes, for an SFPL total of 2,500,979 volumes.[966] Community-based branch libraries, as well as the Main Library, provide reading rooms, book lending, information services, access to technology, and library-sponsored public programs. Most branches offer an event almost every day, often for pre-school and elementary school children: story time, crafts, and videos. Programs for youth include reading and computer-oriented clubs.

All SFPL branch libraries offer books at adult, teen, and children's reading levels. Basic collections consist of fiction, nonfiction, and reference books; magazines; newspapers; audio books; CDs; and DVDS. If specific materials are not available at an SFPL branch, items may be obtained through the library's request system, Link+, or interlibrary loan. Link+ allows SFPL library patrons to borrow items from participating libraries throughout California. Items typically arrive within four days and may be returned to any SFPL branch.[967] Interlibrary Loan involves loaning items from various libraries and institutions in North America that agree to loan items to one another, which may include local universities, such as University of California Berkeley, San Francisco State University, or Stanford University.[968] Most of SFPL's collection of electronic resources is accessible from all branch locations and online 24 hours a day at the SFPL website.

There are three branch libraries within a 2-mile radius of the Project site: the Bayview/Anna E. Waden Branch, the Portola branch, and the Visitacion Valley branch; which are described in Table III.O–9 (Library Branches Serving the Project Site). Public library locations in the Project vicinity are illustrated in Figure III.O–2. In addition to the standard items available at branches, the Bayview branch offers a collection of materials by and about African Americans and has a medium-sized collection of Chinese language materials and a small collection of Spanish language materials. Both the Portola and Visitacion Valley branches offer a medium-sized collection of Chinese language materials. These materials are available to address the needs of each branch community.

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[965] San Francisco Public Library Website. http://www6.sfgov.org/index.aspx?page=116 (accessed: July 8, 2009).
[966] San Francisco Public Library (SFPL), Table: Collection Size, San Francisco Public Library FY 2007–2008, 2008.
[967] San Francisco Public Library (SFPL) Website. http://sfpl.org/sfplonline/linkplus.htm (accessed on September 14, 2009).
[968] San Francisco Public Library (SFPL) Website. Interlibrary Loam Frequently Asked Questions. http://sfpl.org/librarylocations/main/illfaq.htm (accessed on September 14, 2009).

Table III.O-9 Library Branches Serving Project Site

Branch	*Location*	*Distance from Project Site (mile)*	*BLIP Improvements*	*Size of New Collection at Opening*
Bayview	5075 3rd Street	0.5	New Branch. Not Yet Begun.	43,000 to 45,000 volumes.
Portola	380 Bacon Street	1.5	New Branch. Opened February 2009	33,000 volumes
Visitacion Valley	45 Leland Avenue	1.0	New Branch. Reopens 2010	35,000 to 40,000 volumes

SOURCE: San Francisco Public Library Website. Branch Library Improvement Program. http://sfpl.org/news/blip/improvementprogram.htm (accessed September 14, 2009); Written correspondence with Brian Bannon, Chief of Branches, San Francisco Public Library with Allison Wax, PBS&J on September 9, 2009.

All branches have room for 10 to 15 percent growth.

In 1994, San Francisco voters passed Proposition E, a charter amendment that created the Library Preservation Fund. This measure established a dedicated fund to be used to provide library services and materials, as well as to operate library facilities. Proposition E established a 15-year mandate that requires the City to maintain funding for the San Francisco Public Library at a level no lower than what it spent during the 1992 and 1993 fiscal year. Voters renewed the Library Preservation Fund in November 2007 (Proposition D).

Branch Library Improvement Program

The Branch Library Improvement Program (BLIP) was launched as a result of a bond measure passed in November 2000 to provide $106 million in funding to upgrade San Francisco's branch library system, and Proposition D, which passed in November 2007, authorizing additional funding to improve the branches. The BLIP is intended to provide the public with seismically safe, accessible, technologically updated, and code-compliant City-owned branch libraries in every neighborhood[969]. Improvements to be made at each branch were determined through the preparation of a "Community Needs Assessment" for each branch, with public meetings, community surveys, and outreach to neighborhood organizations. Design options, such as public meeting rooms, more computers, separate teen facilities, child and adult reading areas, and other library services, were considered. Choices about each branch reflect its budget (which is fixed) input from staff, and input from the neighborhood, in part through community meetings to discuss services and architectural plans.

The SFPL has implemented a number of interim programs to serve the public while branches are closed for renovation or replacement. These include increasing hours at nearby branches, holding programs at neighborhood schools and community centers, and offering bookmobile services.

One of the priorities of the 2000 bond measure was to replace four branches housed in leased facilities with City-owned branches, two of which are located in the Portola and Visitacion Valley neighborhoods. New Portola and Visitacion Valley branches have since been constructed or are currently being constructed. The new one-story, 6,300-square-foot Portola branch opened in February 2009. The branch opened with a collection of 33,000 items and has room to grow 10 percent to 15 percent. Construction of the new Visitacion Valley branch began in summer 2007 and is scheduled to be completed in 2010. The new branch will be approximately 8,500 square feet and will open with a collection of between 35,000 and 40,000 volumes and has been designed to accommodate an additional 10 percent to 15 percent in collection size.

[969] San Francisco Public Library, *Branch Library Improvement Program—Frequently Asked Questions*, 2009. http://www.sfgov.org/site/frame.asp?u=http://www.sfpl.org/ (accessed: July 8, 2009).

The Bayview/Anna E. Waden branch, one of the branches serving the Bayview neighborhood and the Project site, was also identified for renovation under the BLIP, and has been funded as part of Proposition D. Because of the increased service needs in the area, the community support for a new branch, and the difficulty meeting the service needs with a renovation, the SFPL decided to build a new Bayview branch library. The Bayview branch library will be at the same site as the existing branch and the expansion will occupy an adjacent site. The new branch will be approximately 9,000 square feet and will open with a collection of 43,000 to 50,000 volumes with room to grow its collection by 10 to 15 percent. Construction is scheduled to begin in early 2010 and open in late 2011. During construction, library services will be provided by holding programs at neighborhood schools and community centers and by a bookmobile service.[970]

III.O.12 Regulatory Framework

Federal

There are no federal library service regulations applicable to the Project.

State

There are no state library service regulations applicable to the Project.

Local

San Francisco Public Library Strategic Plan (2003–2006)

The SFPL Strategic Plan was adopted in 2003 and remains the guiding document for the SFPL. As stated in the SFPL Strategic Plan, there is no national standard for library service. Instead, each library must evaluate how it may best meet the needs of the community. To this end, the SFPL has developed the Strategic Plan that provides every library facility and program with a unifying organizational vision and system-wide goals. These goals are broad and flexible to tailor services to each unique neighborhood. The Strategic Plan also provides a framework to consider opportunities for new programs and services.[971]

III.O.13 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to library services, but generally consider that implementation of the Project would have significant impacts if it were to:

O.d Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, [or the] need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives for library services

[970] San Francisco Public Library, *New Bayview/Anna E. Waden Branch Library Frequently Asked Questions*, 2009. http://www.sfgov.org/site/frame.asp?u=http://www.sfpl.org/ (accessed: July 8, 2009).
[971] San Francisco Public Library Strategic Plan 2003–2006.

Analytic Method

Impacts on library services are considered significant if an increase in population or development levels would result in an increased demand for library services that would require the need for new or physically altered library facilities in order to maintain acceptable service ratios, the construction of which could result in substantial adverse environmental effects.

Additionally, the Project's potential contribution to cumulative library impacts is evaluated.

Construction Impacts

Impact PS-7: Library Services during Construction

Impact PS-7 **Construction activities associated with the Project would not affect provision of school services by decreasing access to library services. (No Impact) *[Criterion O.d]***

Construction of the Project would not result in impacts to the San Francisco Public Library system, as the construction itself would not result in an increase in population requiring library services. Also, no library branches are located on the Project site. All library services would be available to the community throughout the duration of project construction. As such, no impact to library services during construction of the project would occur. No mitigation is required.

Operational Impacts

Impact PS-8: Library Services during Operation

Impact PS-8 **Implementation of the Project would not result in an increase in demand for library services that is not met by existing library facilities in the vicinity that have been expanded or updated. (Less than Significant) *[Criterion O.d]***

Residential and nonresidential development associated with the Project would increase demand for local library services in the Bayview neighborhood. The Project would result in a population increase of 24,465 residents and 10,730 employees. The development at Candlestick Point would result in a population increase of 18,290 residents and 3,476 employees, and the development at HPS Phase II would result in a population increase of 6,175 residents and 7,254 employees. Although the Project would result in a substantial direct and indirect population increase within the Bayview neighborhood, library branches serving the Project site, including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Each of the three new library branches serving the Project are designed to accommodate 10 to 15 percent growth in their collection size.

Services offered at each library are based on a variety of factors including collection size, and by weighing the benefits of adding community rooms, study areas, and designated spaces for teens, children, and adults. All of the library branches serving the Project site were designed to accommodate 10 to 15 percent growth

in its collection size.[972] If materials are not available at a specific branch, materials can be made available in a matter of days through the SFPL's delivery system, which provides for the delivery of materials from one branch to another branch, utilizes Link+ system to access books at participating libraries in California, or request a loan from the Interlibrary Loan system, which involves loaning items from various libraries and institutions in North America. As such, materials available to library patrons are not limited to those housed at their neighborhood library, making the number of volumes at each branch location not a valid measure to evaluate library services. In the event that additional services are needed in any neighborhood, the SFPL dispatches a bookmobile to address immediate needs and the SFPL's current Strategic Plan would provide guidance as to how to address increased demands resulting from population growth in consideration of the branch's fixed budget.

The new SFPL branches, which would all be completed upon build-out of the Project, would accommodate increased demand from the Project. No additional library facilities would be required to accommodate development proposed in the Project. Impacts to libraries would be less than significant, and no mitigation is required.

However, space within the Project site would also be dedicated to the provision of library services to supplement the expanded Bayview branch library. As part of the Project, a 1,500 gsf reading room and space for automated book-lending machines would be integrated into the community retail and public facilities uses that are proposed.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts associated with libraries is the City of San Francisco. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process. The City of San Francisco provides public services within the City's boundaries.

The Branch Library Improvement Program (BLIP), launched as a result of a 2000 bond measure, included plans for construction of eight new library branches. The BLIP includes completion of a "Community Needs Assessment" for each branch, with public meetings, community surveys, and outreach to neighborhood organizations. Most branch libraries in the City are currently being renovated, or are planned for future renovation, under the BLIP program. As stated in the SFPL Strategic Plan, there is no national standard for library service and each library must evaluate how it may best meet the needs of the community. To this end, the SFPL has developed the Strategic Plan, which provides every library facility and program with a unifying organizational vision and systemwide goals.

Development of reasonably foreseeable future projects within the City, in conjunction with past and present development, would increase resident population as well as generate new employment, which could increase demand on public library resources. The SFPL Strategic Plan is based, in part, on population projections for build-out of the General Plan, which includes the development anticipated at the Project site. All cumulative projects (past, present, and reasonably foreseeable) that are within the identified

[972] Written correspondence with Brian Bannon, Chief of Branches, San Francisco Public Library with Allison Wax, PBS&J, September 9, 2009.

population projections would be understood to have been considered during development of the Strategic Plan. Therefore, it is not anticipated that cumulative development would result in a significant cumulative impact to library services.

Residential and non-residential development associated with the Project would increase demand for local library services in the Bayview neighborhood. As noted, the existing SFPL branches and construction of the proposed Reading Room that is part of HPS Phase II would accommodate the increased demand from the Project. No additional library facilities would be required to accommodate development proposed in the Project. Therefore, no new or physically altered library facilities would be required in order to maintain acceptable service ratios for public library services. There is no significant cumulative impact with respect to library resources, and the Project's cumulative impact would be less than significant.

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SECTION III.P RECREATION

III.P.1 Introduction

This section of the EIR analyzes whether the Project would (1) increase the use of existing parks and recreational facilities such that substantial physical deterioration or degradation of the facilities would occur or be accelerated or that new or expanded facilities would be required; (2) result in substantial adverse construction-related effects associated with the provision of new or physically altered parks and recreational facilities, whether on site or off site; and/or (3) adversely affect existing recreational facilities. This section analyzes the potential for both Project level and cumulative environmental impacts. The analysis in this section concludes that the Project could have potentially significant environmental impacts related to the timing of proposed park; therefore, a mitigation measure is included.

Data used in this section includes information obtained from the San Francisco Recreation and Park Department (SFRPD), the California Department of Parks and Recreation (CDPR), as well as the California Department of Parks and Recreation *Candlestick Point State Recreation Area General Plan* (CPSRA General Plan), Association of Bay Area Governments (ABAG) *San Francisco Bay Trail Plan*, ESA *Windsurfing Memorandum* (refer to Appendix P1 [Windsurfing Report]), San Francisco Bay Conservation and Development Commission *San Francisco Bay Plan*, San Francisco Bay Conservation and Development Commission *Bay Area Water Trail Plan*, and the *City of San Francisco General Plan*.

III.P.2 Setting

Existing Parks and Recreational Facilities

For purposes of this analysis, parks are generally defined as areas of land set aside for various recreational opportunities for the public. Recreational facilities are those structures and/or improvements that are built at parks (e.g., benches, picnic tables, tennis courts, etc.). Open space areas are typically unimproved parkland. Therefore, parks and recreational facilities are typically used interchangeably, whereas open space areas refer to those areas where the land is either kept in its natural state or enhanced in order to return the land to its natural state. However, when calculating the City's overall park acreage, open space areas are considered part of the overall total.

Citywide and Regional Resources

Property in San Francisco that is permanently dedicated to publicly-accessible park and recreational uses totals approximately 5,886 acres.[973] The population of San Francisco as of January 1, 2008, was 824,525,[974] yielding a ratio of, or 7.1 acres per 1,000 San Francisco residents. The City has not established a citywide target ratio of parkland to residents, nor has it adopted a *Quimby Act* ordinance requiring land dedications

[973] San Francisco Planning Department, personal communication, Sue Exline, October 26, 2009.
[974] California Department of Finance, E-1 Population Estimates for Cities, Counties, and the State with Annual Percent Change—January 1, 2008 and 2009 http://www.dof.ca.gov/research/demographic/reports/estimates/e-1_2006-07(accessed online June 12, 2009), and Section III.,C (Population, Employment, and Housing).

or in-lieu fees, because San Francisco's population density, small land mass, and other development constraints make such policies infeasible.[975]

The SFRPD maintains more than 200 parks, playgrounds, and open spaces throughout the City, as well as 15 recreation centers, nine swimming pools, five golf courses, and a number of tennis courts, ball diamonds, athletic fields, and basketball courts. The SFRPD also manages the Marina Yacht Harbor, Candlestick Park stadium, and the Lake Merced Complex. The CDPR owns approximately 120.2 acres at Candlestick Point State Recreation Area (CPSRA) within the Project site, as stated in Table II-4 (Candlestick Point Proposed Land Use Summary) in Chapter II (Project Description). (This acreage does not include the Yosemite Slough Restoration area, which is approximately 34 acres.) The San Francisco Bay Trail (Bay Trail) is a multipurpose recreational trail that, when complete, will encircle San Francisco and San Pablo Bays with a continuous 400-mile network of bicycling and hiking trails. It will connect the shoreline of all nine Bay Area counties, link 47 cities, and cross the major bridges in the region. To date, approximately 290 miles of the alignment have been completed.[976]

In the vicinity of the Project site, a segment of the Bay Trail runs from Heron's Head Park around the India Basin Shoreline, with a gap in the middle of the segment near the north side of HPS. In addition, a segment of the trail runs from Candlestick Park south to the southern boundary of Candlestick Point.

As shown in Figure III.P-1 (Existing and Approved Parks and Open Space) there are numerous existing public parks and open spaces located within the Project site and in the nearby vicinity.

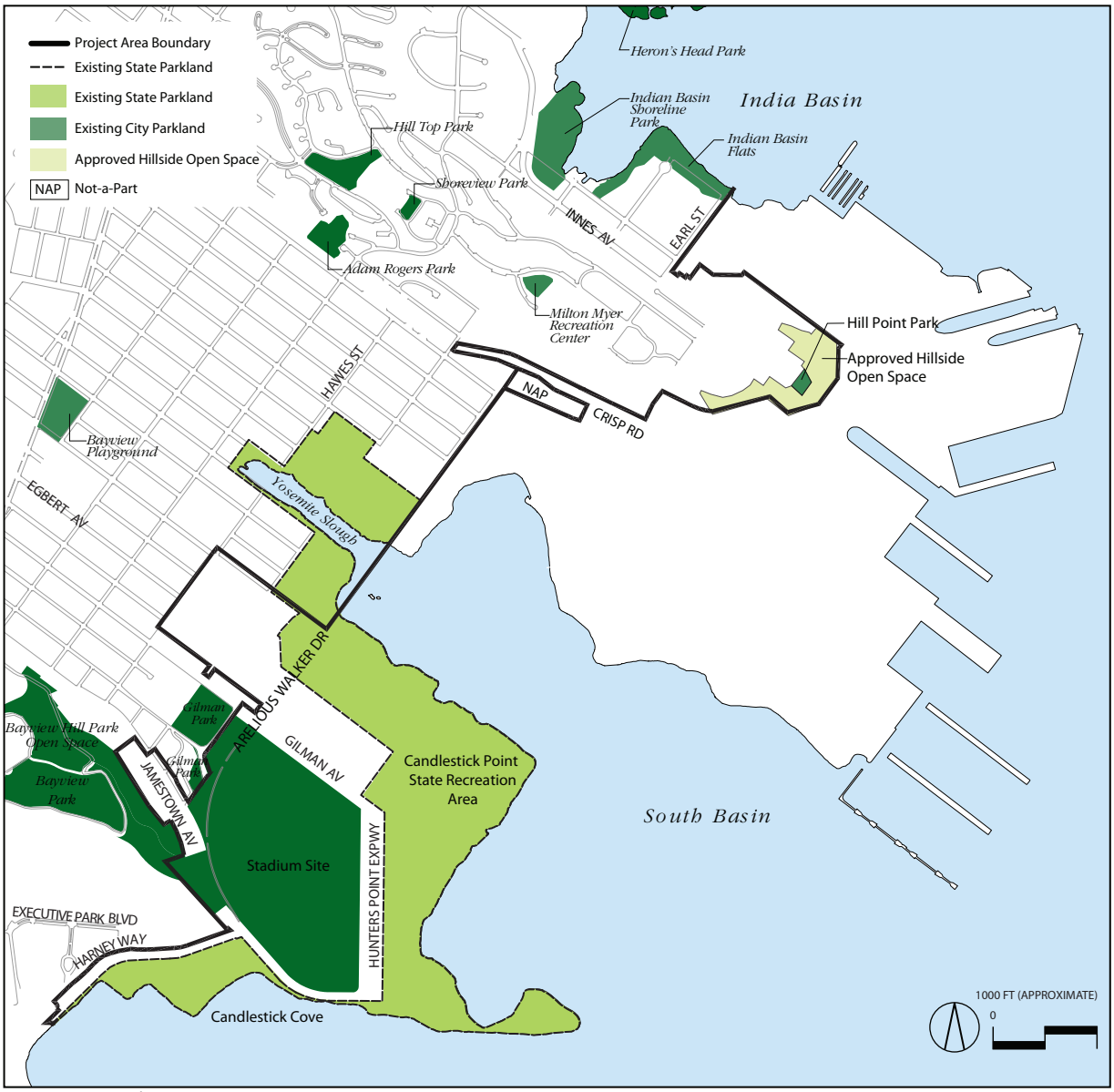
Resources on the Project Site

Two existing parks and recreational facilities, encompassing approximately 203 acres, are located within the Candlestick Point site, as illustrated by Figure III.P-1. These existing parks include the CPSRA and Candlestick Park (home of the existing 49ers stadium). There are no existing public open space areas at the HPS Phase II site.

CPSRA

CPSRA (120.2 acres), on the shoreline of Candlestick Point, was acquired by the State in 1977 for development as a State recreation area. The southern portion of the park is the most developed and actively used area (totaling approximately 47 acres), while the northern areas are unimproved and underutilized (totaling approximately 73 acres). The CPSRA lands to the northeast of Yosemite Slough include a now defunct auto salvage yard, old warehouse, and two business locations that are currently occupied by a sound studio and a cabinet shop. CDPR leases the buildings to these tenants on a month-to-month basis. The southern portions of the CPSRA include picnic areas, a fitness course for seniors, a bike path, shoreline access to the Bay for water-dependent recreation, and recreational trails (Photo 1). CPSRA land to the north and east of the Candlestick Park stadium is currently used for stadium parking; this area total approximately 40 acres. Other portions of the CPSRA site contain construction rubble and debris, such as

[975] City of San Francisco General Plan, Recreation and Open Space Element, 1986.
[976] Association of Bay Area Governments (ABAG), *San Francisco Bay Trail Overview*, 2008. http://www.abag.ca.gov/bayarea/baytrail/overview.html (accessed August 2, 2009).



SOURCE: Lennar Urban, RHAA, 2009; PBS&J, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

EXISTING AND APPROVED PARKS AND OPEN SPACE

FIGURE III.P-1

the Last Rubble Pile Disposal Site (Photo 2). Until recently, the Last Rubble area was characterized by large piles of rubble and debris, remnants of the site's previous use as a dumping ground. California State Parks, with a grant from the California Integrated Waste Management Board, removed 10 acres of rubble and debris in 2009. As a result of this, the majority of the rubble and debris was either removed or crushed on site. Yosemite Slough is part of the CPSRA, but is not within the Project site except for at its neck, where the proposed bridge would be constructed.

The annual visitation for day use at CPSRA for 2007/2008 was reported as 15,200 paid day-use passes and 200,283 free day-use visitors, for a total of 215,483.[977]

Candlestick Park

Candlestick Park (83 acres),[978] is the site of the stadium owned by the SFRPD and leased by the San Francisco 49ers National Football League team. The existing stadium, built in 1960, seats 70,000 and is used for football games and other non-football entertainment events.

Candlestick Point State Recreation Area is comprised of improved and unimproved park areas.

Improved Area. *Photo 1 is of Main Beach, an already improved area of the CPSRA which includes multi-purpose trails, habitat areas, vegetation, and access to the waterfront. This area is located in the proposed Wind Meadow and Heart of the Park areas (discussed in detail under Impact RE-2).*

Unimproved Area. *Photo 2 is of the Last Rubble Pile Disposal Site. This area, located within the northeastern area of the CPSRA, was formerly used as a concrete dumping ground. More recently, this area underwent debris removal and was marginally improved as a result of a grant from the Integrated Waste Management Board in 2009.*

Other Nearby Facilities. As illustrated by Figure III.P-1, the following SFRPD facilities are within one-quarter mile of the Project site, considered to be walking distance for many users:

- Gilman Park (4.6 acres) is a playground located immediately northwest of Candlestick Park. It includes plastic and metal play equipment with restrooms, picnic tables, a dog area, and a basketball court.

[977] California State Park System, *Statistical Report, 2007/2008 Fiscal Year.* http://www.parks.ca.gov/pages/795/files/07-08%20statistical%20report%20final%20online%20version_2.pdf (accessed on October 13, 2009).
[978] The stadium itself occupies 14.5 acres. The rest of the site is devoted to ancillary uses, such as parking.

- Bayview Park (44 acres), which is off Third Street and Key Avenue immediately west of the Project site, includes picnic areas, natural habitat areas, and recreational trails.
- India Basin Shoreline Park (11.8 acres), on the India Basin Shoreline north of Innes Avenue, includes two children's playgrounds, picnic areas, shoreline access to the Bay for water-dependent recreation, and recreational trails.
- India Basin Flats (also called India Basin Open Space) is unimproved SFRPD property on the Bay periphery of India Basin, northwest of the Project site, off of Innes Avenue. India Basin Flats consists of about 4.5 acres[979] of public land (also referred to as "India Basin Open Space", as indicated on Figure III.P-1, as well as additional, adjacent acreage that is privately held (and not indicated on Figure III.P-1).
- Milton Myer Recreation Center at Kiska Road is a multipurpose facility with meeting spaces, an indoor gymnasium, outdoor game courts, and a children's playground.
- New parks and open spaces (approximately 36 acres) are under development at the HPS Phase I site, adjacent to HPS Phase II.[980] Those parks would provide passive open space, gathering areas, tot lots, trails, view terraces, and picnic facilities.

Other facilities (most of which are operated by the SFPRD) that are located beyond a quarter mile of the Project site, but within approximately one-half-mile of the Project site, include the following:

- LeConte Avenue Mini Park (0.5 acre) is adjacent to and west of Bayview Park (just west of the area shown on Figure III.P-1).
- Bayview Playground (4.6 acres) is a children's playground on Third Street between Armstrong and Carroll Streets that also contains a pool and a softball field.
- The Bayview Hunters Point Multipurpose Senior Center, at Yosemite Avenue and Third Street, offers a range of services and activities for seniors. The Senior Center is not operated by the SFPRD.
- Heron's Head Park (24 acres), formerly known as Pier 98, is a restored wetland owned by the Port of San Francisco and used for research, education, afterschool activities, and natural habitat.
- Other nearby parks also include Hill Top Park (3.4 acres), which includes grassy areas and walking paths; Adam Rogers Park (2.8 acres), which is just south of Hill Top Park, and contains a basketball court, a children's playground, a restroom, and a community garden; and Shoreview Park (0.5 acre), just east of Hill Top Park and on the opposite side of the Jedediah Smith School, contains a children's playground and an open grassy area. Shoreview Park is not operated by the SFPRD.

A number of other small neighborhood parks, playgrounds, and recreational facilities are located beyond a half-mile of the Project site, but within zip code 94124 (east of I-280 and US-101). These include Ridgetop Plaza (0.3 acre), Youngblood-Coleman Playground (6.1 acres), the Joseph Lee Recreation Center (1.9 acres), the Palou-Phelps Mini-Park (3.6 acres), and the Silver Terrace Playground (5.5 acres). While these uses are more than one-half mile from the Project site, they are accessible via direct street connections and are not separated from the Project site by freeways or other physical barriers. Significant other regional recreational resources and parks in the City include Golden Gate Park, Crissy Field, Lake Merced Park, McLaren Park and the Presidio.

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[979] San Francisco Planning Department, Draft India Basin Shoreline Subarea Plan, June 2009.

[980] San Francisco Redevelopment Agency, *Phase I Disposition Development Agreement*, Exhibit D (Public Open Space), 2001. http://www.sfgov.org/site/sfra_page.asp?id=5588 (accessed August 3, 2009). This parkland is expected to be available for use in 2012.

Existing Users

People living and working in a specified area generate local demand for parks and recreational facilities. The current population at Candlestick Point is about 1,113 persons (refer to Table III.C-1 [Existing Population (2005)] in Section III.C [Population, Housing, and Employment]). As stated above, there are a total of approximately 203 acres of existing parks (including the 83-acre stadium site) at the Project site. The local population, however, does not have access to the stadium for general park and recreational use. Therefore, based on a park estimate of 120.2 acres (203 acres less the 83-acre stadium), the existing ratio of persons to acres of parkland is 108 acres per 1,000 residents, which is very high because the site is primarily non-residential and includes the large CPSRA.[981]

III.P.3 Regulatory Framework

Federal

Land and Water Conservation Fund Act of 1965

The *Land and Water Conservation Fund Act of 1965* (LWCFA) was enacted to assist in preserving, developing and assuring accessibility to outdoor recreation resources and to strengthen the health and vitality of US citizens. The LWCFA accomplishes these goals by providing funds and authorizing assistance to states in planning, acquiring, and developing land and water areas and facilities, including through the Land and Water Conservation Fund.

Land that has been acquired or developed with the assistance of the federally created Land and Water Conservation Fund cannot be converted to uses other than public outdoor recreation without meeting certain requirements. Any such conversion requires approval by the Secretary of the Interior to ensure that substitute recreation lands of at least equal fair market value and reasonably equivalent usefulness and location are provided. The California Park and Recreation Commission (CPRC) received three LWCFA grants between 1979 and 1981 to assist with the development of trails, picnic areas, and other amenities on approximately 35 acres of the CPSRA. The reconfiguration of the CPSRA, discussed further below, would comply with the LWCFA. Compliance would require the determination of the fair market value of any of these lands that the Project converts to uses other than public outdoor recreation and the provision of replacement lands of at least equal fair market value and reasonably equivalent usefulness and location.

State

Candlestick Point State Recreation Area General Plan

Refer to Section III.B regarding a description of the CPSRA General Plan and its application to the Project. The following information about the CPSRA General Plan is related to the Recreation analysis.

[981] This park-to-population ratio assumes a population of 1,113, as identified in Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Housing, and Employment). The population of 1,113 correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.

Conceptual land uses and facilities are shown on the CPSRA General Plan Land Use and Facilities map. The Facilities Element lists the following types of recreational uses for the park: trails (hiking, jogging, and bicycling), group picnic areas, family picnic areas, group campgrounds, fishing piers, wind surfing facilities, a sand beach, a quiet area in the southeastern point, scenic overlooks, and a cultural program center. Maritime facilities include a non-powered boat/wind surfing rental facility; a boating center for boat classes and education; a boat access facility that includes a four-lane launching ramp; a 200-space parking area for car-boat trailers; a boat service station; and a ferry landing. A family dinner restaurant and family picnic rest stop are proposed for the Last Port area to the west of Hermit's Cove, off Harney Way.

Current uses in the park include hiking, limited bicycling, day use picnicking, group picnicking, jogging, nature viewing, three sand beaches, undeveloped windsurfing, two piers used daily by fishermen, and three restroom buildings. The park also includes a park staff/maintenance facility, 140 parking spaces for the developed portion of the park, and a community garden.

Some uses have been identified within the CPSRA as potential uses, although they have not been implemented to date, including: group campgrounds; non-powered boat/wind surfing rental facility; boating center; boat access facility that includes a four-lane launching ramp; ferry landing; boat service center; family restaurant and family group rest stop at Harney Way. There is a boat trailer parking area; however, it is not used for boating activities. Every use that has not been developed is still considered a proposed use under the CPSRA General Plan.[982] As such, the CPSRA General Plan has not been fully realized.

As part of the current General Plan process, CDPR's planning staff will facilitate a public planning process to solicit comments and feedback on any new improvements intended for the park. As such, current design and planning elements described in this document represent a proposal. The proposed vision for the park will undergo further review and is subject to change as a result of the General Plan process.

San Francisco Bay Trail Plan

Refer to Section III.B regarding a description of the San Francisco Bay Trail Plan and its application to the Project. The following information about the San Francisco Bay Trail Plan is related to the Recreation analysis.

The Project would include the construction of the Bay Trail throughout the Project. It would support the proposed waterfront trail connection route identified within a 2005 Gap Analysis Study prepared by ABAG for the entire Bay Trail area for the purpose of identifying gaps in the Bay Trail, as well as strategies to complete the Bay Trail system. Following implementation of the Project, the existing trail south of the Project would ultimately connect to the existing northern trail along the India Basin shoreline. The Bay Trail would be accessible for pedestrians and bicyclists with connections to the existing and new parks, from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the CPSRA, Yosemite Slough, and HPS Phase II shoreline to India Basin.

Relevant recreation and trail policies from the Bay Trail Plan that apply to the Project with respect to trail alignment and trail design are listed below:

[982] California Department of Parks & Recreation, 2009. Email communication with Steve Bachman, Senior Park & Recreation Specialist, September 16.

- **Trail Alignment Policies**
  - > Ensure a feasible, continuous trail around the Bay.
  - > Minimize impacts on and conflicts with sensitive environments.
  - > Locate trail, where feasible, close to the shoreline.
  - > Provide a wide variety of views along the Bay and recognize exceptional landscapes.
  - > Investigate water trails as an enhancement to the trail system where necessary or appropriate.
  - > In selecting a route for the trail, incorporate local agency alignments where shoreline trail routes have been approved. Incorporate San Francisco Bay Conservation and Development Commission public access trails where they have been required.
  - > Where existing trails through wetlands are well-maintained and well-managed, the Bay Trail can feasibly be routed there. In these cases, trails should be used according to current regulations. Alternate routes should be provided where necessary and additional buffering/transition areas designed to protect wetland habitats should be provided where appropriate to protect wildlife.
  - > In selecting a trail alignment, use existing stream, creek, slough and river crossings where they are available. This may require bridge widening in some locations. In selecting trail alignments, new stream, creek and slough crossings should be discouraged. Where necessary because acceptable alternatives do not exist, bridging may be considered.
  - > In order to minimize the use of existing staging areas along the shoreline and to reduce the need for additional staging areas, the choice of trail alignment should take full advantage of available transit, including rail service (e.g., Caltrain, BART), ferries, and bus service.
- **Trail Design Policies**
  - > Creation of a regionwide hiking and bicycling trail system can be achieved if planning for all trail facilities takes full advantage of opportunities for connections to other existing and proposed recreational systems. The proposed Bay Trail connector trails, in particular, begin to create a regional network by programming links with the Bay Area Ridge Trail.
  - > Wherever possible, new trails should be physically separated from streets and roadways to ensure the safety of trail users.
  - > Create a trail that is as wide as necessary to accommodate safely the intended use, with separate alignments, where feasible, to provide alternative experiences.
  - > Highlight the interpretive potential of certain trail segments, including opportunities for interpretation, education, rest and view enjoyment.
  - > Incorporate necessary support facilities, using existing parks, parking lots, and other staging areas wherever possible.
  - > Design new segments of trail to meet the highest practical standards and regulations, depending on the nature and intensity of anticipated use, terrain, existing regulations, and standards on existing portions of the trail.
  - > Minimum and maximum standards by use, width, surface, etc. should be developed, to ensure safe enjoyment of the trail and compatibility with surroundings and existing facilities, and to encourage use and design of surfaces for which long-term maintenance will be cost-effective.
  - > Design and route the trail to discourage use of undesignated trails.

> A consistent signing program should be established throughout the trail system, using a Bay Trail logo which will identify trails within the Bay Trail system as distinct from other connecting trails. The choice of materials used should be the concern of the individual implementing jurisdictions and agencies.

> The Bay Trail signing program may include necessary cautionary and regulatory signing, including warnings of seasonal trail closings and other restrictions on trail use. Interpretive signing may be provided to help educate trail users about the surrounding environment and the importance of observing trail use restrictions and staying on designated trails.

> The trailhead signing program may include a variety of information which will enhance the Bay Trail experience. This may include a description of the length and relative difficulty of the trail as a guide for trail users with mobility limitations, available support facilities, available access to other connecting trails, and a description of the habitat resource which emphasizes interpretive information as well as the need to observe posted trail use restrictions.

San Francisco Bay Plan

Refer to Section III.B regarding a description of the San Francisco Bay Plan and its application to the Project. The following information about the San Francisco Bay Plan is related to the Recreation analysis.

Recreation-related objectives and policies of the Bay Plan are contained in Part IV—Development of the Bay and Shoreline: Findings and Policies: Recreation objectives and policies that are relevant to the Recreation analysis emphasize the creation of diverse and accessible water-oriented recreational facilities, such as marinas, launch ramps, beaches, and fishing piers. Such facilities should be provided to meet the needs of a growing and diversifying population, and should be well distributed around the Bay and improved to accommodate a broad range of water-oriented recreational activities for people of all races, cultures, ages, and income levels. Recreational facilities, such as waterfront parks, trails, marinas, live-aboard boats, non-motorized small boat access, fishing piers, launching lanes, and beaches, should be encouraged and allowed by the Commission, provided they are located, improved and managed consistent with BCDC policies. Waterfront parks should emphasize hiking, bicycling, riding trails, picnic facilities, swimming, environmental, historical and cultural education and interpretation, viewpoints, beaches, and fishing facilities.

San Francisco General Plan

The Recreation and Open Space Element of the *San Francisco General Plan* contains several policies pertaining to the development of parks and recreational facilities. The following policies are relevant to the development proposed under the Project:

Objective 1 Preserve large areas of open space sufficient to meet the long-range needs of the Bay region.

Policy 1.1 Protect the natural character of regional open spaces and place high priority on acquiring open spaces noted for unique natural qualities.

Objective 2 Develop and maintain a diversified and balanced citywide system of high-quality open space.

Policy 2.1 Provide an adequate total quantity and equitable distribution of public open spaces throughout the City.

	Policy 2.2	Preserve existing public open space.
	Policy 2.7	Acquire additional open space for public use.
	Policy 2.8	Develop a recreational trail system that links city parks and public open space, ridgelines and hilltops, the Bay and ocean, and neighborhoods, and ties into the regional hiking trail system.
Objective 3	Provide continuous public open space along the shoreline unless public access clearly conflicts with maritime uses of other uses requiring a waterfront location.	
	Policy 3.1	Assure that new development adjacent to the shoreline capitalizes on its unique waterfront location, considers shoreline land use provisions, improves visual and physical access to the water, and conforms to urban design policies.
	Policy 3.2	Maintain and improve the quality of existing shoreline open space.
	Policy 3.3	Create the Bay and Coastal Trails around the perimeter of the City which links open space along the shoreline and provides for maximum waterfront access.
	Policy 3.5	Provide new public open spaces along the shoreline.
Objective 4	Provide opportunities for recreation and the enjoyment of open space in every San Francisco neighborhood.	
	Policy 4.3	Renovate and renew the City's parks and recreation facilities.
	Policy 4.4	Acquire and develop new public open space in existing residential neighborhoods, giving priority to areas which are most deficient in open space.
	Policy 4.6	Assure the provision of adequate public open space to serve new residential development.
	Policy 4.7	Provide open space to serve neighborhood commercial districts.

III.P.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to recreation, but generally consider that implementation of the Project would have significant impacts if it were to:

P.a Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration or degradation of the facilities would occur or be accelerated

P.b Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered park or recreational facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, or other performance objectives[983]

[983] Thresholds P.a and P.b are discussed together.

P.c Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment

P.d Adversely affect existing recreational opportunities

Analytic Method

The Project would provide a wide variety of new and improved parks and open space areas. The Project also proposes an agreement between the CDPR and the City or the Agency to reconfigure the boundaries of CPSRA, which would also result in improvements to the CPSRA. The potential impacts of the proposed agreement are analyzed in Impact RE-3.

The analysis below considers the increase in use that would be generated by the Project and the ability of existing facilities (many of which will be improved by the Project) and new open space that would be provided by the Project to meet that demand. The analysis considers whether an increase in use would result in the substantial physical deterioration of existing recreational facilities (e.g., disturbance of vegetation, accelerated wear on sports facilities and fields, erosion along trails, and an increased potential for increased graffiti and litter) or in the need for new or expanded facilities. The analysis further considers whether the Project would diminish or otherwise adversely affect recreational opportunities at the existing facilities (chiefly CPSRA) on the Project site. The analysis of construction impacts associated with the development of proposed new parks and recreational facilities, which are considered as part of the overall Project, draws on conclusions in other sections of this EIR.

The analysis uses a parkland-to-population ratio to measure demand for recreational facilities. If demand is excessive, then use could result in or accelerate substantial physical deterioration of facilities, or could require the construction of further facilities. If, on the other hand, demand is within an acceptable range, then use will not lead to such impacts. The City does not have an adopted parkland-to-population ratio standard. In the past, the National Parks and Recreation Association has recommended a parkland-to-population ratio as high as 10 acres per 1,000 population. As noted in the Recreation and Open Space Element of the City General Plan, however, "[g]iven the City's existing development patterns, high population density, and small land mass (28,918 acres), [this] standard will not be possible to achieve within the City limits." The General Plan goes on to state that "to the extent it reasonably can, the City should increase the per capita supply of public open space within the City" from the parkland-population ratio at the time of the General Plan's adoption (1986), 5.5 acres per 1,000 residents. This analysis will, therefore, use the 5.5 ratio as a benchmark: a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities.

This standard is consistent with, and in fact provides for more parkland than, other commonly used standards. For example, the state's *Quimby Act* allows jurisdictions to select a standard from 3 to 5 acres of parkland per 1,000 residents when imposing a parkland mitigation requirement. Other nearby Bay Area jurisdictions (e.g., the City of Palo Alto and the City of Menlo Park) use a standard of 5 acres per 1,000 residents.

The Project's potential contribution to cumulative park and recreation impacts, if any, are also evaluated in the context of existing, proposed, and reasonably foreseeable future development expected in the City.

Construction Impacts

Impact RE-1: Construction of Parks, Recreational Uses, and Open Space

Impact RE-1 **Construction of the parks, recreational uses, and open space proposed by the Project would not result in substantial adverse physical environmental impacts beyond those analyzed and disclosed in this EIR. (Refer to Sections III.D [Transportation and Circulation], III.H [Air Quality], III.I [Noise], III.J [Cultural Resources and Paleontological Resources], III.K [Hazards and Hazardous Materials], and III.M [Hydrology and Water Quality]) *[Criterion P.c]***

The Project includes the construction and improvement of substantial new parks, recreational facilities, and open space. At build-out, the Project would include approximately 336 acres of parks and open space as described in Table III.P-1 (Proposed Parks and Open Space) and illustrated by Figure III.P-2 (Proposed Park and Open Space). Candlestick Point would include approximately 104.8 acres of parks and open space, including the CPSRA; HPS Phase II would include approximately 231.6 acres of parks and open space.

Development of the parks and recreational facilities would require construction activities, which could vary depending the location and type of work. If existing structures are located on identified park sites, such structures could require demolition. Sites would be cleared and graded and construction of these new parks could include installation of utilities (electrical, water, sanitary sewer, and storm drainage); hardscape (e.g., concrete, asphalt, stone, walls, sport-court and play area surfacing, decking/boardwalks); new or renovated site structures (e.g., restrooms, picnic/shade shelter's, kiosks, pavilions, overlooks, piers); and site furnishings (e.g., benches, picnic tables, drinking fountains, play equipment, fencing, artwork, lighting). The installation of shoreline protection features would also occur, where necessary. Site planting would include installation of irrigation systems and would focus on re-vegetation and restoration of native plant communities, where possible, and may include creation of new saltwater and freshwater habitats. Open space areas would generally not require extensive construction activities, but could require re-vegetation, the creation of trails, and other non-invasive activities.

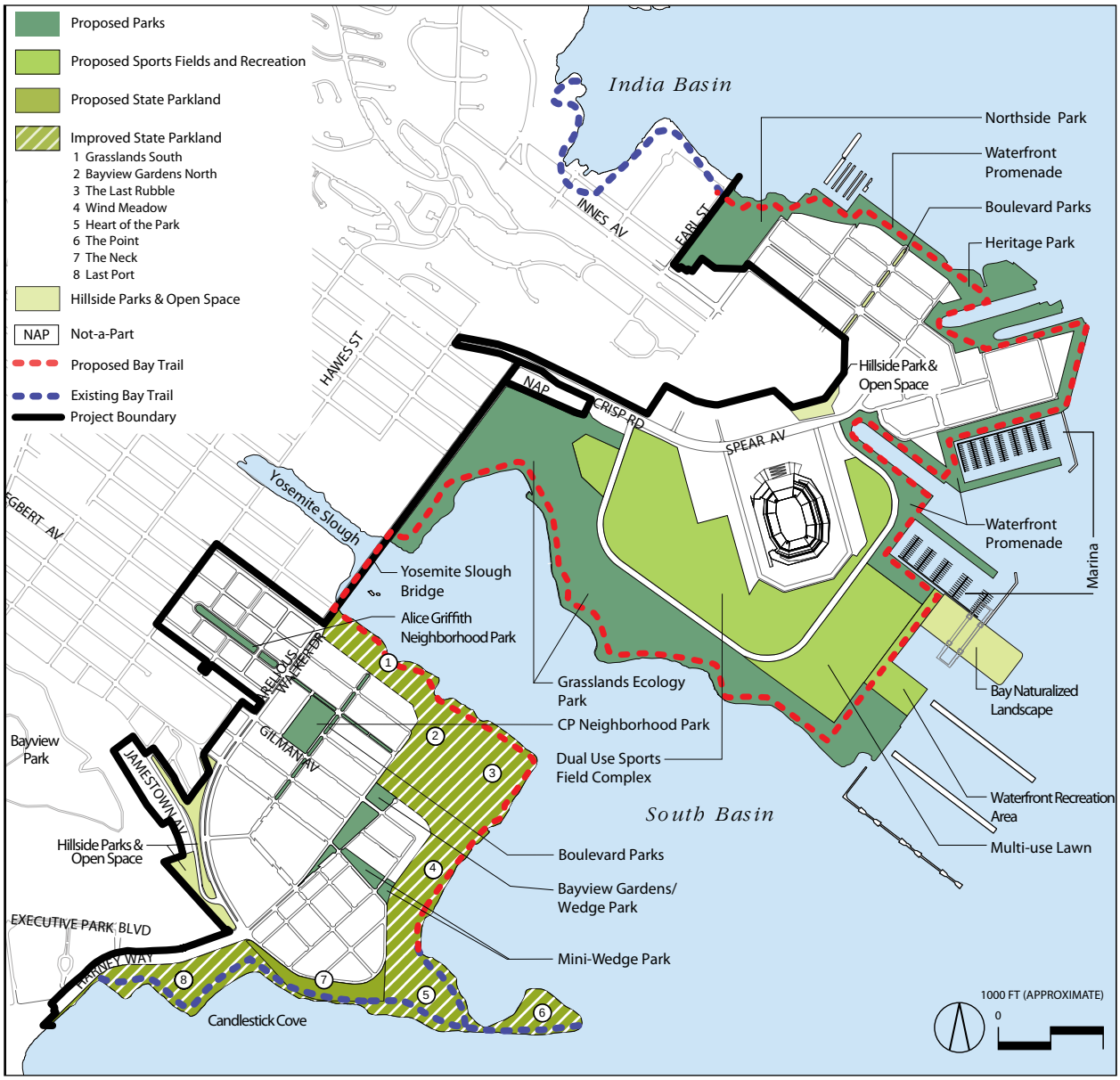
Construction activities associated with the proposed parks and recreational facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of parks and recreational facilities, is provided in the applicable sections of this EIR, including Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), Section III.J (Cultural Resources and Paleontological Resources), Section III.K (Hazards and Hazardous Materials), Section III.M (Hydrology and Water Quality), and Section III.N (Biological Resources). Construction impacts would be temporary. While it is likely that construction of the various park and recreational facilities identified in Table III.P-1 would not result in significant impacts (either individually or combined), construction of the entire development program, of which the parks and recreational facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H,

Table III.P-1 Proposed Parks and Open Space

Location		*Acres*
CANDLESTICK POINT		
New Parks		
Alice Griffith Neighborhood Park		1.4
Candlestick Point (North) Neighborhood Park		3.1
Bayview Gardens/Wedge (Destination) Park		2.5
(Candlestick Point South) Mini-Wedge Park		1.1
	Subtotal	*8.1*
New and Improved State Parkland (CPSRA)[a]		
The Last Port (includes 0.4 acre of new State parkland)		14.6
The Neck (includes 3.8 acres of new State parkland)		4.9
The Heart of the Park (includes 1.5 acres of new State parkland)		15.4
The Point		6.1
Wind Meadow		11.4
The Last Rubble		24.5
Bayview Gardens North		9.5
Grasslands South		10.3
	Subtotal	*96.7*
	Total	***104.8***
HUNTERS POINT SHIPYARD PHASE II		
New Parks		
Northside Park		12.8
Waterfront Promenade		29.5
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		44.9
Grasslands Ecology Park at Parcel E-2		37.2
	Subtotal	*140.0*
New Sports Fields and Active Urban Recreation		
Sports Field Complex / Game Day Stadium Parking		59.7
Waterfront Recreation Area		6.7
Multi-use lawn		25.2
	Subtotal	*91.6*
	Total	***231.6***
TOTAL PARKS AND OPEN SPACE		
New Parks		148.1
New Sports Fields and Active Urban Recreation		91.6
New and Improved State Parkland		96.7
	Total	***336.4***

SOURCE: Lennar Urban, 2009

a. The 120.2-acre CPSRA would be reduced by 29.2 acres, and increased by 5.7 acres for a net reduction of 23.5 acres. The Neck, The Heart of the Park, and The Last Port are the three locations where new State Park Land would be added.



SOURCE: Lennar Urban, RHAA, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED PARKS AND OPEN SPACE

FIGURE III.P-2

Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[984]

In addition, and as further discussed in Impact RE-2 and the cumulative impact analysis, the Project would provide adequate parks, recreational facilities, and open space to accommodate the expected increase in demand resulting from the Project and cumulative development. No further construction would be required beyond that proposed by the Project.

Operational Impacts

Impact RE-2: Deterioration or Degradation of Existing Parks and Recreational Facilities

Impact RE-2 **Implementation of the Project would not increase the use of existing parks and recreational facilities that would cause the substantial physical deterioration of the facilities to occur or to be accelerated, nor would it result in the need for, new or physically altered park or recreational facilities. (Less than Significant with Mitigation) *[Criterion P.a]***

The Project would bring new residents to the Project site and increase the use of existing parks and recreational facilities, but it would also provide substantial new parks and recreational facilities, improve existing facilities, and provide long-term funding for operation and maintenance.

At build-out of the Project, the projected population within the Project site would increase from approximately 1,113 to approximately 24,465 residents, and employment would increase from 529 to approximately 10,730 jobs (refer to Section III.C of this EIR). The increase in population and employment would likely result in an increase in the use of existing parks, recreational facilities, and open space. However, new and improved parks, recreational facilities, and open space would be provided as part of the Project to offset the increase in demand on existing parks and open space areas created by the Project's new residents and employees. In fact, a total of 336.4 acres of parks, recreational facilities, and open space would be provided at the Project site, consisting of 239.7 acres of new parks, sports fields, and active urban recreation uses, and 96.7 acres of existing and improved parkland at the CPSRA.[985]

This analysis first identifies the proposed new facilities, and then analyzes whether the increase in the use of parks would lead to the substantial physical deterioration or degradation of existing and proposed facilities or result in the need for new or expanded facilities.

[984] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analyses. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

[985] For comparison purposes, the Project's proposed 336.4 acres of parks and open space would be greater than the 141.5 acres of public open space that was to be provided under the Hunters Point Shipyard Reuse Plan Final EIR (June 2000).

Proposed New Facilities

Overall, the Project would provide a substantial increase in the amount of developed, useable, high-quality parks, recreational facilities, and open space within the Project site. The Project would create a continuous network of interconnected recreational opportunities, promoting the use of the existing parks, such as the CPSRA, as well as the 239.7 acres of new parks, sports fields, and active urban recreation uses. The Project would provide a network of pedestrian and bike pathways that would connect Project uses to the adjacent neighborhoods and would ensure unrestricted public access to the parks and open space on the Project site and the Bay shoreline. Enhanced connectivity of on-site and off-site facilities and new neighborhood parks would allow integration of new and existing facilities into the citywide park network. The proposed bicycle and pedestrian pathways would facilitate dispersal of future demand, which would help to reduce the potential for localized physical deterioration. The improved connectivity would also direct regional users to proposed "destination" parks, parks designed to accommodate regional demand. In addition, the Project would provide a continuous series of waterfront parks from the northernmost part of HPS Phase II to the southernmost part of Candlestick Point.

In addition, proposed recreational facilities, such as paved athletic courts, plazas, and picnic areas, would also support a large number of users within a relatively small area. Recreational facilities proposed for the Project site also include a Sports Field Complex that would provide soccer/football, baseball, and volleyball fields, as well as warm-up fields, restrooms, and food concessions. The parking area for the Sports Field Complex would support parking during stadium events, but would be covered with specially engineered soils and turf to allow dual-use of the parking lot for athletic fields. Recreational facilities would also include a mix of active and passive areas of open lawns, dog runs, play areas, community gardens, and court games. Moreover, improved park facilities would provide a waterfront promenade, ecological open space areas, concessions, restrooms, and other uses that would allow the site to support a large service population.

The discussion below identifies the specific new facilities that are planned within Candlestick Point and HPS Phase II. These facilities are also identified in Table III.P-1, above, and shown on Figure III.P-2. Some features, such as the Bay Trail improvements, span both areas of the Project site.

Candlestick Point

Candlestick Point would include an extensive network of parks, ranging from the CPSRA to smaller parks distributed throughout the neighborhood. The Candlestick Point parks would be connected to other neighborhoods and open spaces by way of pedestrian-friendly green streets.

- The 1.4-acre Alice Griffith Neighborhood Park would extend for several blocks near the center of the neighborhood as an extension of Egbert Avenue.
- Candlestick Point North would include a 3.1-acre Candlestick Point Neighborhood Park in the center of the district.
- The 1.1-acre Mini-Wedge Park in the Candlestick Point South district would serve as a primary connector between Candlestick Point and the CPSRA beach area.
- The Bayview Gardens/Wedge Park (2.5 acres) would serve as the 'commons' for the Candlestick Point development and link the residences to the CPSRA through an expansive view corridor. Specific programming would include an ecological garden, a main plaza, passive lawns, bioswale stormwater retention, and tot lots.

These parks would be connected to other neighborhoods and open spaces within the community by way of pedestrian-friendly green streets.

Candlestick Point State Recreation Area

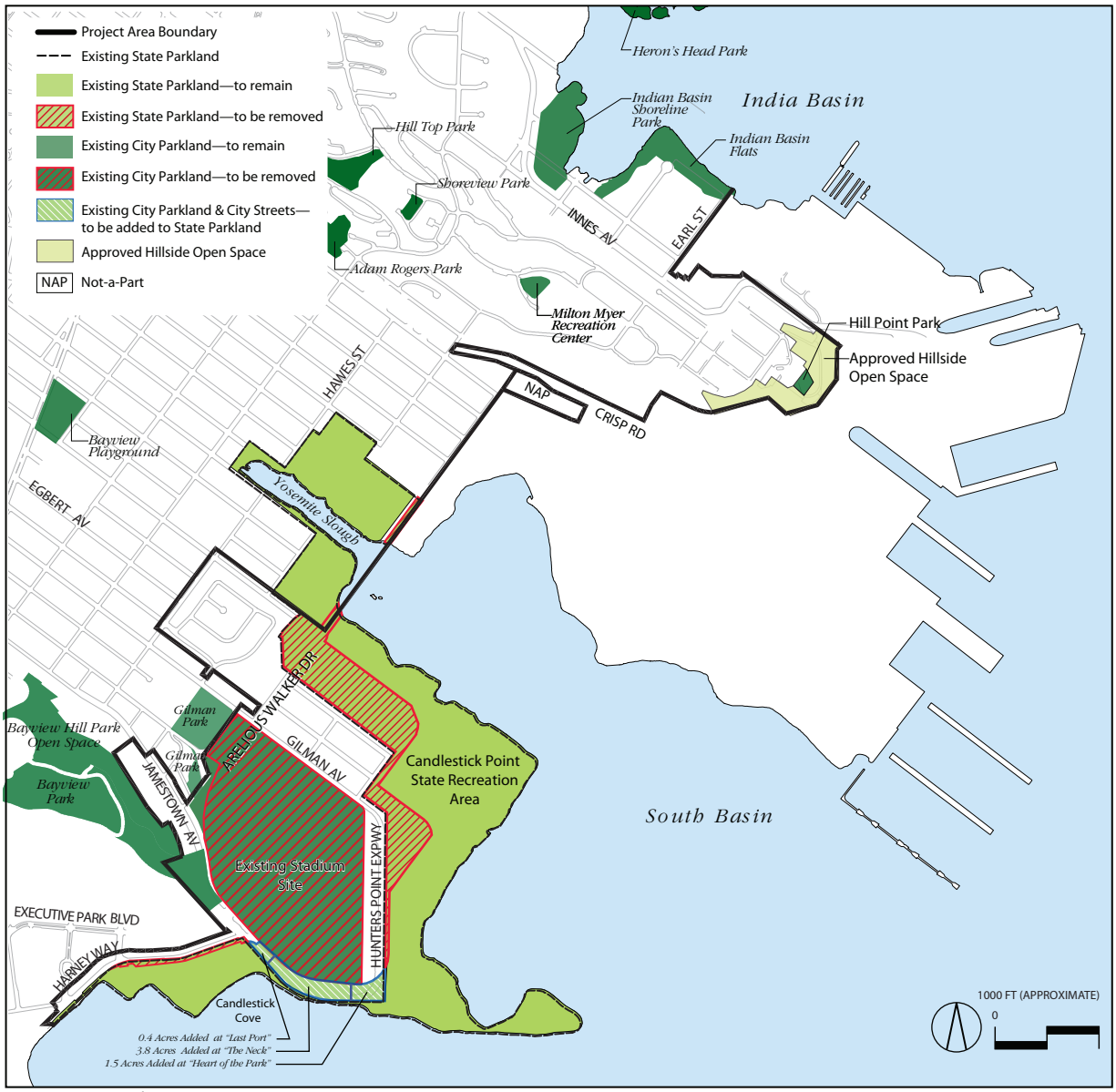
Senate Bill 792 (SB 792) (refer to Appendix P2 [SB 792]) was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002,* the *Hunters Point Shipyard Public Trust Exchange Act,* and *Public Resources Code* Section 5006.8, and consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. These additional acres would widen the park in an area where the CPSRA boundary currently runs very close to the shoreline, creating a very narrow "pinch point" in the park. The additional acreage would thus create a buffer between development and the shoreline and improve the recreational value of this section of the park. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres. Table III.P-2 (Proposed Candlestick Point State Parks Land Agreement) presents the acreage of the areas proposed to be added to and removed from the park. Figure III.P-3 (Proposed CPSRA Reconfiguration) illustrates the area of CPSRA and City parkland to remain or to be removed, and the amount of CPSRA parkland to be added.

Table III.P-2 Proposed Candlestick Point State Parks Land Agreement

	Candlestick Point (acres)
Existing State Parkland at Candlestick Point	120.2
Area removed from State Parkland	(29.2)
Area added to State Parkland	5.7
Proposed State Parkland at Candlestick Point	96.7

SOURCE: Lennar Urban, 2009.

The portion of the park that is currently undeveloped or used for Candlestick Park stadium parking would be substantially improved to enhance overall park aesthetics and landscape ecology; reconnect visitors to the bay shoreline; and provide direct access to the bay for swimming, fishing, kayaking, and windsurfing. Proposed improvements include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), a biofiltration pond to cleanse stormwater, the provision of habitat and opportunities for environmental education, 'Eco-Gardens,' and salt-marsh restoration. Although there would be a net decrease in the total area of the CPSRA, the recreational value of the new land with the improvements would increase the area's value.



SOURCE: Lennar Urban, RHAA, 2009; PBS&J 2010.

PBS&J 04.16.10 02056 | JCS | 10

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROPOSED CPSRA RECONFIGURATION

FIGURE III.P-3

Specific areas of improvements in the CPSRA are discussed below. The discussion is presented to provide an overview of the conceptual design that is currently proposed. However, the ultimate configuration of each of these areas would be at the discretion of the California Department of Parks and Recreation through the ongoing planning process for the CPSRA.

Figure III.P-4 (Photographs of Existing CPSRA—Areas 1 and 2) through Figure III.P-7 (Photographs of Existing CPSRA—Areas 7 and 8) provide a representative photograph of each of the eight designated areas within the CPSRA that are described below (and illustrated by Figure III.P-2). Figure III.P-8 (Aerial View of CPSRA within the Project Site [Excluding the Yosemite Slough]) shows the existing unimproved and improved areas of the CPSRA and indicates where land would be removed or added relative to the existing CPSRA uses.

The Last Port

The area known as the "Last Port" (south of Harney Way) is presently designated within the CPSRA General Plan for a dinner restaurant, a family picnic rest stop, a parking area, trails, and native trees and shrubs with open grassy areas. Current facilities here include trails, parking, family picnic areas, and a restroom building. Landscape features include open meadow areas, berms planted with trees and shrubs, and a beach. The Project proposes changes to the CPSRA boundary in this area to add approximately 0.4 acre of additional land. In addition, the Last Port and The Neck would include a new beach area (refer to Figure II-21 [Natural Shoreline Recommended Work Map]).

The Project's landscape improvements for the "Last Port" area would focus on pedestrian circulation, safety, and wayfinding; intensifying areas for increased use; improving the overall park aesthetics and landscape ecology; and providing new overlooks and connections to follow the bay shoreline. Native grasslands and shorelines would be restored and stabilized, providing areas for activities such as strolling, picnics, kite flying, fishing, and direct access to implementation of the bay for swimming, kayaking, and windsurfing.

The Neck

The area known as "The Neck" is a narrow strip of land south of Jamestown Avenue between Harney Way and Hunters Point Expressway. This area is presently designated in the CPSRA General Plan for native trees and shrubs with open grassy areas, trails, picnicking, fishing, and windsurfing. Currently, a pier provides access for fishing and windsurfers use this area as a launching point, although no formal facilities for windsurf launching or lay-down areas are currently provided. The Project proposes reconfiguring the CPSRA boundary here to provide approximately 3.8 acres of additional land and a wider park along the shoreline, including a new beach area. Project facilities would include trails and overlooks, a parking lot, picnic areas, and a windsurf lay-down and launch area.

The Heart of the Park

The area known as "The Heart of the Park" is located south of the main park entry on Hunters Point Boulevard to the isthmus that connects to "The Point." This area is presently designated in the CPSRA General Plan for native trees and shrubs with open grassy areas, trails parking, picnicking, fishing, windsurfing, park administration, and restroom facilities. Existing facilities include the main vehicular

Area 1: Grasslands South

Area 2: Bayview Gardens North

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.P-4

Candlestick Point — Hunters Point Shipyard Phase II EIR

PHOTOGRAPHS OF EXISTING CPSRA – AREAS 1 AND 2

Area 3: The Last Rubble

Area 4: Wind Meadow

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.P-5

Candlestick Point — Hunters Point Shipyard Phase II EIR

PHOTOGRAPHS OF EXISTING CPSRA – AREAS 3 AND 4

Area 5: Heart of the Park

Area 6: The Point

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.P-6

Candlestick Point — Hunters Point Shipyard Phase II EIR

PHOTOGRAPHS OF EXISTING CPSRA – AREAS 5 AND 6

Area 7: The Neck

Area 8: Last Port

SOURCE: PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.P-7

Candlestick Point — Hunters Point Shipyard Phase II EIR

PHOTOGRAPHS OF EXISTING CPSRA – AREAS 7 AND 8

SOURCE: Google Earth Pro, basemap; PBS&J, 2009.

PBS&J 10.30.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

AERIAL VIEW OF CPSRA WITHIN THE PROJECT SITE (EXCLUDING THE YOSEMITE SLOUGH)

FIGURE III.P-8

entrance and kiosk, parking lots, trails, three restrooms buildings, and group and family picnic areas. Landscape features include open meadow areas, berms planted with trees and shrubs, and a sandy beach. The Project proposes changes to the CPSRA boundary in this area to add approximately 1.5 acres of additional land. The Project would retain and enhance much of the existing landscape structure. Planting and overall aesthetics would be improved, pedestrian pathways would be renovated and added, and program areas would be developed for greater use. Improvements are proposed to existing restrooms, picnic areas, and trails. Additionally, new overlooks, an interpretive amphitheater, and reconfigured park entrance and parking facilities are proposed.

The Point

The area known as "The Point" is located at the end of the peninsula at the southeastern portion of the park. This area is presently designated in the CPSRA General Plan as a "quiet area" with native trees and shrubs and open grassy areas, trails, family picnic areas, a fishing pier, and a restroom building. The Project proposes to revitalize the existing site with improvements focused on pedestrian circulation, safety, and wayfinding; intensifying areas for increased use; improving the overall park aesthetics and landscape ecology; and reconnecting visitors to the bay shoreline. Native grasslands and shorelines would be restored and stabilized and new overlook points are proposed.

Wind Meadow

The area known as "The Phase 4 Area" in the CPSRA General Plan would become the "Wind Meadow" after the Project's proposed CPSRA boundary changes. It is presently designated in the CPSRA General Plan for native trees and shrubs with open grassy areas, trails, parking, picnicking, restrooms, and a Cultural Program Center. Additionally, a theater is designated to accommodate a wide variety of events such as dance, music, and theater. The CPSRA General Plan also describes children's play areas, a kitchen, and food concession for this area. Existing development in this area is limited to landscape features, such as sculptural earthwork and walls, trails, grassland and overlooks. This area is currently used for strolling, dog-walking, fishing, and bird watching and is the home of "Main Beach" (illustrated by Photo 1 in this section). Proposed features here would include new trails, restrooms, picnic areas, restored natural landscape areas, waterfront overlooks, and access to the water.

The Last Rubble

Until recently, the Last Rubble area was characterized by large piles of rubble and debris, remnants of the site's previous use as a dumping ground. The California Integrated Waste Management Board completed a rubble and debris removal project in April 2009. As a result of this, the majority of the rubble and debris was either removed or crushed on site. The Last Rubble area is designated in the CPSRA General Plan for native trees and shrubs with open grassy areas, trails, and overlooks. The area currently contains crushed concrete rubble, trails, and a mix of native and non-native grassland and shrubland (refer to Photo 2). The area is used for strolling, dog-walking, and bird-watching. The Project proposes changes to the CPSRA boundary in this area. It would be transformed into a new center for the CPSRA, with a wide variety of new program elements. The park ranger station/visitor's center would be located here, as well as a "Great Meadow" for passive recreational activities. In addition, The Last Rubble would contain a new beach area. Other features here may include parking, picnic areas, overlook terraces, restrooms, and a restaurant/café.

Bayview Gardens North

This area, which is also known as the "Boat Launch," is currently used for stadium parking. It would be transformed by the Project into "Bayview Gardens North." It is presently designated in the CPSRA General Plan for group camping, trails, native trees and shrubs with open grassy areas, and a boat dock for group camps. Currently, the Boat Launch area includes an unused boat ramp, parking lot, and restroom building. Landscape features here include shoreline with riprap and pockets of wetland vegetation. Located between the Bay and the proposed Bayview Gardens/Wedge Park, the Bayview Gardens North area would offer the greatest integration of urban and naturalized open spaces anywhere in the open space system and would provide strong visual gateway to the state parks and the Bay. Bio-swales, stormwater 'Eco-Gardens,' marshland (including potential salt-marsh restoration), new boardwalks, and overlook/fishing piers are central features of this area. Refer to Figure II-21 for the location of the new marshland.

Grasslands South

This area, which runs north along the shoreline from the Boat Launch to Arelious Walker Drive, is currently used for stadium parking and is not available as recreation or open space land. The Project would create grasslands and other habitats and make the area a functioning part of CPSRA's open space. is presently designated in the CPSRA General Plan for parking, park administration, trails, native trees and shrubs with open grassy areas, fishing, and a boat access facility. The boat access facility is described as a four-lane boat launching ramp, 200 car-boat trailer parking spaces, and a concession-operated boat service station. A protective breakwater with docking for ferryboats is also described. Currently, this area is undeveloped and is used as parking for the Candlestick Park stadium. Existing landscape features include shoreline with riprap and pockets of wetland vegetation. A boat ramp and associated parking and restroom facilities have been constructed to the southeast of this area. The Project proposes to reconfigure the boundary of this area and to improve it with trails, overlooks, native grasslands, meadow lawns, marshland, and earthworks shaped to provide shelter from the wind and enhance views. Site features could include overlooks, interpretive play areas, restrooms, overlook terraces, and parking. Refer to Figure II-21 for the location of the new marshland.

The Bay Trail

As briefly described in Section III.P.3 (Regulatory Framework) discussion, and more extensively described in Section III.B, the Bay Trail is a planned recreational corridor that, when complete, will encircle San Francisco and San Pablo Bays with a continuous 400-mile network of bicycling and hiking trails. The Bay Trail would be incorporated into the design of new shoreline park facilities, such as the Waterfront Promenade, Heritage Park, Grasslands Ecology Park, and the CPSRA. It would tie together the entire waterside park system, providing clear connections to regional greenways and connections to waterways. The Bay Trail would encourage users from adjacent neighborhoods and other areas of San Francisco to utilize the new open spaces of the development and provide increased access to the shoreline. More specifically, the Project would include connections to the existing and new parks from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the CPSRA, Yosemite Slough, and HPS Phase II shoreline to India Basin, connecting a gap in the Bay Trail that currently exists between the tip of the CPSRA to Indian Basin Flats. The footings for the Yosemite Slough bridge, under preliminary design, would cross the proposed extension of the Bay Trail under the Bay Trail Plan. Visitors utilizing the Bay Trail in the area of the bridge would be able to cross Arelious Walker Drive and pick up the Bay Trail on the other side of the bridge.

Other Parks and Open Space

- Boulevard Parks within the Project site. A hybrid of street and park, the Boulevard Park Streets bring broad fingers of green space into the urban neighborhoods, linking interior parks with bay-front parks. These streets have a strong pedestrian scale and quality, and serve as public 'front yards' for the neighborhoods. Broad landscaped medians or sidewalks (30-40' wide) are designed as mini-parks with garden seating areas. Boulevard Parks link the Alice Griffith and Central Candlestick communities with the CPSRA.
- Hillside Parks and Open Space within the Project site. The hillside parks and open space include the eastern 'tail' of Bayview Park and other hillside areas below Jamestown Road. The steeper areas and the flatter portion of Bayview Hill will be maintained in a more natural state.
- Yosemite Slough. While not located within the Project site except for the mouth of the slough, where the proposed bridge would be located, the Yosemite Slough is located directly adjacent to but outside of the Project site and is planned for restoration by the California State Parks and the California State Parks Foundation. The restoration will focus on providing new wetland habitat and environmental education opportunities. The proposed Yosemite Slough bridge would cross a small portion of the CPSRA on the southern side of the slough and pass along the edge of the eastern boundary of the CPSRA on the north side.

HPS Phase II

- Northside Park (12.8 acres), which would be located on the north shore of HPS Phase II, would offer a full suite of passive and active uses. The most active park uses are located at the southwestern portion of the park. This area includes community gardens, basketball, tennis, and volleyball courts and shade pavilion, children's playground, and restroom. The open-air African Marketplace would form an east-west promenade crossing the park, with looped pathways around the multi-use lawns providing additional multi-use space. To the northeast, the park takes on a more natural and passive character, with picnic/barbeque areas and shade shelters, and waterfront pathways.
- The Waterfront Promenade (29.5 acres) begins at the northern edge of the site and continues along the shoreline until terminating at the Waterfront Recreation Area described below. The promenade would provide evidence of the historic qualities of the industrial waterfront, which would be incorporated into tree bisques, seating areas, lawn panels, artworks, and interpretive gardens.
- Heritage Park (15.6 acres) would retain and reuse historic resources and materials as much as possible while utilizing modern design with industrial character. Children's play areas and areas of open lawn would be provided.
- Grasslands Ecology Park at Parcel E (44.9 acres) would contain native Eco-Gardens, passive lawns, native grasslands, windbreak groves, and landforms offering views of the bay and shoreline habitats. Site features could include group picnic areas, overlooks, a visitor/interpretive center, restrooms, and parking.

  Grasslands Ecology Park at E-2 (37.2 acres) would provide an open space area that includes picnic areas, grassy bird watching knolls, and overlooks. This passive recreation park would focus on views toward the Yosemite Slough Wetland Restoration area and provide opportunities for environmental education. The 44.9-acre Grasslands Ecology Park at Parcel E and the 37.2-acre Grasslands Ecology Park at Parcel E-2 on HPS Phase II are contiguous to CPSRA.
- The Sports Field Complex would include soccer/football, baseball, and volleyball fields, as well as warm-up fields, restrooms, and food concessions. The Sports Field Complex would be used for sporting events during day- and night-time hours. The surface of the fields would be seeded grass

above top soil with synthetic fibers and other base materials to support vehicle parking and tailgating for 49ers fans on game days. To prevent rutting and damage to the fields, the design will employ a fiber-reinforcement system that is incorporated into fast-draining, sandy soils.

- A Multi-Use Lawn area would provide event-day parking for events at the stadium. At other times, this large open space would provide for informal recreational activities, sporting, and other events as needed.

The Sports Field Complex and the Multi-Use Lawn both surround the proposed 49ers Stadium, providing parking for stadium-related events, as well as open space that would support a range of recreational activities, as described above. The surface of the fields would be seeded grass above top soil with synthetic fibers and other base materials to support vehicle parking.

- The Bay Trail would be incorporated into the design of the parks described above (refer to Figure III.P-2).
- The Waterfront Recreation Area would provide a flexible waterfront open space focused on small boat access could include education and interpretive facilities focused on San Francisco Bay.
- Boulevard Parks. A hybrid of street and park, the Boulevard Park Streets bring broad fingers of green space into the urban neighborhoods, linking interior parks with bay-front parks. These streets have a strong pedestrian scale and quality, and serve as public 'front yards' for the neighborhoods. Broad landscaped medians or sidewalks (30-40' wide) are designed as mini-parks with garden seating areas. Boulevard Park Streets connect the Hunters Point Hilltop community with Waterfront Park.
- Hillside Parks and Open Space Connection. A relatively small portion of the Hillside Park and Open Space located within HPS Phase II north of Crisp Road would provide a connection to the existing Hillside Parks and Open Space constructed in the Hunters Point Phase I project.
- Historic Landmark and Bay Naturalized Landscape. The landmark Re-Gunning Crane will be retained, providing a dramatic juxtaposition of the site's industrial history with the resurgence of nature at the Bay's edge. Trails and boardwalks would lead to overlook points providing visitors with opportunities to view Bay wildlife.

Overall, the Project would provide a substantial increase in the amount of developed, useable, high-quality parks, recreational facilities, and open space within the Project site. The Project would create a continuous network of interconnected recreational opportunities, promoting the use of the existing parks, such as the CPSRA, as well as the 239.7 acres of new parks, sports fields, and active urban recreation uses. The Project would provide a network of pedestrian and bike pathways that would connect Project uses to the adjacent neighborhoods and would ensure unrestricted public access to the parks and open space on the Project site and the Bay shoreline. Enhanced connectivity of on-site and off-site facilities and new neighborhood parks would allow integration of new and existing facilities into the citywide park network. The proposed bicycle and pedestrian pathways would facilitate dispersal of future demand, which would help to reduce the potential for localized physical deterioration. The improved connectivity would also direct regional users to proposed "destination" parks, parks designed to accommodate regional demand. In addition, the Project would provide a continuous series of waterfront parks from the northernmost part of HPS Phase II to the southernmost part of Candlestick Point.

In addition, proposed recreational facilities, such as paved athletic courts, plazas, and picnic areas, would also support a large number of users within a relatively small area. Recreational facilities proposed for the Project site also include a Sports Field Complex that would provide soccer/football, baseball, and volleyball fields, as well as warm-up fields, restrooms, and food concessions. The parking area for the Sports Field

Complex would support parking during stadium events, but would be covered with specially engineered soils and turf to allow dual-use of the parking lot for athletic fields. Recreational facilities would also include a mix of active and passive areas of open lawns, dog runs, play areas, community gardens, and court games. Moreover, improved park facilities would provide a waterfront promenade, ecological open space areas, concessions, restrooms, and other uses that would allow the site to support a large service population.

Potential for Increase in Use of Parks

Overall, the Project would provide approximately 336 acres of new and/or improved park land and recreational facilities to accommodate the estimated build-out population of approximately 24,465 residents within the Project site, consisting of 239.7 acres of new parkland, sports fields, and active urban recreation uses, and 96.7 acres of existing and/or improved parkland.[986] As previously described, the new parks would include a variety of parks, including neighborhood parks, destination parks, boulevard parks, hillside parks and open space connections, waterfront parks, and improvements to the CPSRA. Parkland connectivity would be provided along the waterfront from the northernmost portion of HPS Phase II (at Northside Park) to the southernmost tip of Candlestick Point (at The Last Port of the CPSRA) (refer to Figure III.P-2), an amenity that is not provided today.

The increase in parkland would provide a ratio of about 13.7 acres of parkland per 1,000 residents within the Project site. Although this ratio is lower than the current ratio of 108 acres per 1,000 residents, it is substantially higher than the ratio of 5.5 acres per 1,000 residents identified in the City General Plan and used as a benchmark for this analysis.

The project would also provide approximately 10,730 jobs, which could result in a daytime population of 35,195 (adding the resident population of 24,465, and assuming that no residents were also employees, which is unlikely). Counting the entire daytime population as a part of the population served by the parks on the Project site, the parks-to-population ratio would be 9.5 acres per 1,000 employees/residents, which still exceeds the benchmark ratio of 5.5 acres per 1,000 residents.

Overall, the increase in the resident and daytime population of the Project site would not lead to substantial physical deterioration or degradation of existing facilities, nor would it result in the need for new or expanded facilities. The Project would, therefore, not cause a significant impact and no mitigation is required.

- Despite the availability of sufficient park acreage on the Project site, new residents or employees of the Project site may also choose to use existing parks outside of the Project site (refer to the Setting section for discussion of nearby parks), which could result in the deterioration or degradation of those existing resources. Similarly, it is possible that existing residents of the nearby area could also use parks, recreational facilities, and open space provided by the Project. Thus, this analysis considers the parkland-population ratio for the broader Bayview community, including the Project site and adjacent areas.

[986] As mentioned in the Setting section, there are approximately 203 acres of existing parkland at the Project site, consisting of 120.2 acres for the CPSRA and 83 acres for the stadium. The stadium is not included in any of the resident-to-parkland calculations as useable parkland.

According to the 2000 US Census, the population of the BVHP area in zip code 94124 was 33,170.[987] The boundaries of zip code 94124 are formed by Cesar Chavez Street to the north, US-101 to the west, the Bay to the east, and the southern tip of the CPSRA to the south. Adding the Project population of 24,465 and the Project employee population of 10,730 to the existing (2000) population for Bayview was added to yields a total of 68,365 people potentially using the parks in the area.

There are a total of 181.2 acres of additional park resources in zip code 94124. The major parklands in this zip code area include Gilman Park (4.6 acres), Bayview Park (44 acres), India Basin Shoreline Park (11.8 acres), the new parks and open spaces proposed for HPS Phase I (36 acres)988, Le Conte Avenue Mini-Park (0.5 acre), Heron's Head Park (24 acres), Hill Top Park (3.4 acres), Adam Rogers Park (2.8 acres), Shoreview Park (0.5 acre), Bayview Playground (4.6 acres), Ridgetop Plaza (0.3 acre), Youngblood-Coleman Playground (6.1 acres), the Joseph Lee Recreation Center (1.9 acres), the Palou-Phelps Mini-Park (0.3 acre), and the Silver Terrace Playground (6.1 acres). The combined total of the Project parks (336.4 acres) and the other parks within zip code 94124 (181.2 acres) would be 517.6 acres, resulting in a parks-to-population ratio of 7.6 acres per 1,000 population. This exceeds the benchmark ratio of 5.5 acres per 1,000 population. Therefore, the increase in the Project's resident and employee population and the existing area population would not lead to substantial physical deterioration or degradation of existing and proposed facilities, nor would it result in the need for new or expanded facilities. The Project would, therefore, not cause a significant impact and no mitigation is required.

Park Phasing

The timing of Project development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities.

The conceptual development plan described in Chapter II would result in the development of residential units and parks during all of four stages of development. Figure II-17 shows the particular residential and park areas that would be developed or improved in each phase. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland to be provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site. As this table indicates, at the end of each phase, the park-to-population ratio would be no lower than 13.8 acres per 1,000 residents. Table III.P-3a (Residential Units, Employment, and Park Acreage Provided during Each Stage of Development) identifies the resulting park-to-population ratio for residents and employees of the Project site. With the employee population added, the lowest park-to-population ratio at the end of a phase would be 9.6 acres per 1,000 residents/employees following the last stage of development.

[987] US Census Bureau American FactFinder, http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&Geo_id=&_geoContext (accessed on October 11, 2009).
[988] This park development is expected to be completed in 2012.

Table III.P-3 Residential Units and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*
Existing	256	1,113[a]	120.2	108
Phase 1	3,160	7,363[b]	235.6	32.0
Phase 2	5,165	12,035[b]	246.9	20.5
Phase 3	7,670	17,872[b]	250.4	14.0
Phase 4	10,500	24,465[b]	336.4	13.8

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Housing, and Employment). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.
b. Calculated as 2.33 people per residential unit.

Table III.P-3a Residential Units, Employment, and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*	*Employees*	*Park-to-Population Ratio (acres per 1,000 Residents & employees)*
Existing	256	1,113[a]	120.2	108	—	201.5
Phase 1	3,160	7,363	235.6	32.0	2,346	24.3
Phase 2	5,165	12,035	246.9	20.5	7,474	12.7
Phase 3	7,670	17,872	250.4	14.0	10,595	8.8
Phase 4	10,500	24,465[b]	336.4	13.8	10,730	9.6

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Housing, and Employment). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.
b. Calculated as 2.33 people per residential unit.

During a given phase, however, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual, and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed.

MM RE-2 *Phasing of parkland with respect to residential and/or employment-generating uses. Development of the Project and associated parkland shall proceed in four phases, as illustrated by Figure II-16 (Proposed Site Preparation Schedule) of Chapter II (Project Description) of this EIR. To ensure that within each phase parks and population increase substantially concurrently, development shall be scheduled such that adequate parkland is constructed and operational when residential and employment-generating uses are occupied. The following standards shall be met:*

- *No project development shall be granted a temporary certificate of occupancy if the City determines that the new population associated with that development would result in a parkland-to-population ratio within the Project site lower than 5.5 acres per 1,000 residents/population, as calculated by the Agency.*

- *For the purposes of this mitigation measure, in order for a park to be considered in the parkland-to-population ratio, the Agency must determine that within 12 months of the issuance of the temporary certificate of occupancy, it will be fully constructed and operational, and, if applicable, operation and maintenance funding will be provided to the Agency.*

Implementation of mitigation measure MM RE-2 would ensure that adequate parkland is provided as residential and employment-generating uses are constructed and occupied, and, at no time, shall the parkland-to-population ratio fall below 5.5 acres per 1,000 residents/population, as calculated by the City. Impacts related to parkland development with respect to development phasing would be less than significant.

Impact RE-3: Adverse Effects on Existing Recreational Facilities

Impact RE-3 **Implementation of the Project would decrease the size of CPSRA but would not, overall, have an adverse effect on the recreational opportunities offered by that park, nor would it substantially adversely affect windsurfing opportunities at the Project site. (Less than Significant) *[Criterion P.d]***

While the Project's reconfiguration of CPSRA would remove a net of 29.2 acres from the park, all of that acreage is degraded or unimproved (and not maintained) and does not provide substantial recreation opportunities to the community. Most of the land that would be removed from CPSRA is either currently used for stadium parking or is directly adjacent to Harney Way. The reconfiguration would add 5.7 acres of new parkland in The Last Port, The Neck, and The Heart of the Park, all areas that are currently developed and actively used that have high value as recreational resources. This additional acreage would widen the park at this important point, increasing its capacity for new users. Although there would be a net decrease in the total area of the CPSRA, that portion of the CPSRA that is currently developed and used for recreational purposes would be further expanded (by 5.7 acres) and improved.

Moreover, the Project would provide substantial improvements throughout the CPSRA. These improvements, which are described at length in the discussion of Impact RE-2, include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), the provision of habitat and opportunities for environmental education, "Eco-Gardens," and salt-marsh restoration. The proposed Yosemite Slough bridge would cross a small portion of the CPSRA on the southern side of the slough and pass along the edge of the eastern boundary of the CPSRA on the north side. The area removed for bridge footings would impinge on approximately 300 feet or less (270 feet) through the CPSRA. On the south side, the bridge would extend Arelious Walker Drive through a portion of the CPSRA. Persons using the Bay Trail would be able to cross Arelious Walker Drive and easily access the opposite portion of the CPSRA. Thus, while the road and bridge approach on the south side of the slough would cross the CPSRA, it would not act as a physical barrier preventing use of the entire CPSRA. While the proposed road and bridge would cut through the open space in one location, the majority of the restored Slough area would remain unaffected and available for its intended use. Figure III.P-8 shows the existing unimproved and improved areas of the CPSRA and indicates where land would be removed or added relative to the existing CPSRA uses. These improvements would turn portions of the Park that are used for Candlestick Park stadium parking or are undeveloped and underutilized into functional parts of the CPSRA and of the Project's overall network of parks; see, for example, the descriptions above of The Last Rubble and The Wind Meadow. Currently improved parts of the CPSRA, such as The Heart of the Park, The Point, The Neck, and The Last Port, would also be improved. Overall, the reconfiguration and improvements would

enhance park aesthetics and landscape ecology; provide connections throughout the CPSRA and the other Project parks; and provide direct access to the Bay and the Bay shoreline for walking, swimming, fishing, kayaking, and windsurfing. The Project's proposed reconfiguration of the CPSRA therefore would not adversely affect the park's existing recreational facilities and opportunities.

The improvement and development of the CPSRA is expected to increase usage of CPSRA by visitors from outside the immediate Project vicinity (increased usage by the Project population and nearby residents is discussed above in Impact RE-2). While the number of additional visitors cannot be accurately predicted at this time, the Project's improvement will increase the amount of land at CPSRA that provides recreational opportunities (as discussed above), and will thus enable the park to accommodate the new demand. Moreover, the agreement between CDPR and the City or the Agency, providing for the reconfiguration of CPSRA, would also provide substantial funding for operation and maintenance of the park. This funding would further enable the park to accommodate increased demand.

Increased visitation to CPSRA would not significantly and adversely affect the park's existing recreational facilities and opportunities. A less-than-significant impact would occur, and no mitigation is required.

Windsurfing Analysis

As noted above, CPSRA is currently used by windsurfers as a launching point, and the Project proposes enhanced direct access for windsurfers. A Technical Memorandum for Wind Conditions (Technical Memorandum) was prepared for an adjacent development (Executive Park) to study the wind conditions at a windsurfing launch site at the CPSRA.[989] This document is included in Appendix P1. The Project was specifically considered in the Technical Memorandum as part of the cumulative development scenario that was analyzed for Executive Park. Wind direction is important in that an adverse direction can make it more difficult to launch, to reach a desirable sailing area, or to return to the launch site. Wind is necessary to launch and land, but if winds are too strong at the launch site, beginners and less-skilled windsurfers could find it difficult to do either.

There are no specific criteria for minimum or maximum wind speeds needed to support "good" windsurfing. If a project were to cause substantial wind speed reductions or increases over much of a major windsurfing area or at an irreplaceable launching or landing site, the utility of the CPSRA and Bay as an important windsurfing area could be affected.

The Technical Memorandum studied wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes the Project, generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). The Project would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

[989] Environmental Science Associates, *Potential Wind Conditions at Executive Park Development,* May 4, 2009.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts to recreational resources is the City of San Francisco. The past and present development in San Francisco is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process, including the Yosemite Slough Restoration Project, Executive Park, Jamestown, Hunters Point Shipyard Phase I, Hunters View, and India Basin Shoreline, as well as additional growth in the City envisioned through 2030 (refer to analysis below).

The SFRPD maintain the City's parks, playgrounds, recreation centers, and open spaces throughout the City. The California Department of Parks and Recreation owns approximately 120.2 acres at CPSRA within the Project site. The National Park Service operates approximately 619 acres of parkland within the City as part of the Golden Gate National Recreation Area (GGNRA), including Alcatraz Island, Crissy Field, the Presidio, Fort Mason, and Ocean Beach.

The City's Recreation and Park Acquisition Policy recognizes that the localized neighborhood service populations' need for parks and recreational facilities vary based on demographic characteristics. The cumulative projects in San Francisco could include recreational facilities or would be required to improve or expand existing recreational facilities. Any potential impacts resulting from the construction or improvement of new or existing park and open space facilities provided by cumulative development would be specific to the particular project being constructed, its local context, and the specific construction impact. For example, the Recreation and Park Acquisition Policy includes a criterion that land purchased by the SFRPD that has a record of hazardous or toxic contamination must by fully remediated by the seller prior to acquisition. The Department of Toxic Substances Control has adopted a similar policy requiring land covenants at hazardous materials sites prior to redevelopment of those sites for recreational and other uses. Additional mitigation measures would likely be required to reduce construction-related significant impacts to air quality, traffic, noise, or other affected environmental resources resulting from construction of cumulative recreational facilities. As noted, above, construction activities associated with the proposed parks and recreational facilities of the Project would be temporary and, further, mitigation measures are identified in this EIR to reduce significant impacts, although not always to a less-than-significant level. A discussion of cumulative project-related construction impacts, including those associated with the construction of parks and recreational facilities is provided in the applicable sections of this EIR. (Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the cumulative analysis and conclusions.)

Development of cumulative projects, but not the Project, would result in the increased use of existing neighborhood and regional parks and other recreational facilities by the total estimated City population of 892,335 persons in 2030 (refer to Section III.C).[990] If no new parks or recreational facilities were built in

[990] As discussed in Section III.C (Population, Employment, and Housing), the City recently developed citywide planning projections that would capture Citywide growth expected by 2030 considering the ABAG Projections 2009 target, but also taking into account local knowledge of projects currently in various stages of the entitlement process. Specifically, the 2030 population projection of 916,800 included the Project and two other large development programs currently undergoing environmental review (Treasure Island and Park Merced). To determine the 2030 population in the absence of the Project, this analysis subtracts the Project population of 24,465 from that projection.

San Francisco by 2030 and the inventory were to remain at approximately 5,886 acres[991] the ratio of acres of parkland per 1,000 residents would be approximately 6.6 acres.

At full build-out, the Project would increase the City's inventory of parkland to 5,989.2 acres[992], and its population to 916,800. The City's parkland-to-population ratio would remain approximately 6.6 acres per 1,000 residents. This is greater than the benchmark of 5.5 parkland acres per 1,000 population. In light of the Project's improvements, the City's stock of high-quality recreation land would be substantially increased, even as its parkland-to-population ratio remains the same.

Because there would be sufficient parkland and open space to adequately serve the projected City population in 2030 (including the Project and other growth envisioned by the City), even without the development of new parks and open space proposed by the Project, there is no significant impact to recreation as a result of development of the cumulative projects. Therefore, there is no cumulative impact to which the Project could contribute.

Refer to Section III.G (Wind) for a discussion of cumulative wind impacts.

[991] This assumption is conservative in that it is highly unlikely that there would be no additional development of parkland in the City. Future developments such as Treasure Island and Park Merced will be required to provide substantial amounts of parkland.

[992] The total of 6,102.2 acres of parkland consists of 5,886 acres of existing parkland (including the 120.2 acres of the CPSRA) plus the 216.2 new parkland acres provided by the Project. This figure assumes that the Project's new parkland is the only new parkland in the City between now and 2030. As explained above, that is very unlikely. The actual parkland-to-population ratio in 2030 is likely to be substantially higher than the 6.5 reported here.

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SECTION III.Q UTILITIES

III.Q.1 Introduction

This section evaluates the effects on utilities and service systems related to implementation of the Project by identifying anticipated demand and existing and planned utility availability. For purposes of this EIR, utilities include water supply, wastewater conveyance and treatment, and solid waste collection and disposal. Stormwater[993] is discussed in Section III.M (Hydrology and Water Quality). The impacts of the Project related to electricity and natural gas demand and consumption are analyzed in Section III.R (Energy). This section analyzes electricity, natural gas, and telecommunications infrastructure relative to their ability to serve the Project site. This section identifies both Project-level and cumulative environmental impacts, as well as feasible mitigation measures that could reduce or avoid the identified impacts. The baseline conditions used in this analysis are identified under each utility discussion.

Data used to prepare this section include information obtained from the San Francisco Public Utilities Commission (SFPUC), the California Integrated Waste Management Board (CIWMB), the San Francisco Bay Regional Water Quality Control Board (RWQCB), and other regulatory agencies and service providers. Water demand was estimated in the *Water Supply Assessment for the Proposed Candlestick Point–Hunters Point Shipyard Phase II Project* (WSA) prepared by PBS&J for the SFPUC, included as Appendix Q1 (Water Supply Assessment). Additional information was obtained from several studies prepared on behalf of Lennar Urban, including the *Candlestick Point/Hunters Point Shipyard Infrastructure Concept Report* (2007) prepared by Winzler & Kelly Consulting Engineers; the *Low Impact Development Analysis* (2008) prepared by Winzler & Kelly; the *LID Stormwater Opportunity Study* (2009) prepared by Arup; the *Revised Water Demand Memorandum* dated October 15, 2009, and April 28, 2010,[994] by Arup, included as Appendix Q2 (Arup, Amendment to Water Demand Memorandum #16—Variant 2A [Housing/R&D Variant], April 28, 2010); Technical Memorandum from Hydroconsult Engineers dated October 2009 (Appendix Q3 [Technical Memorandum from Hydroconsult Engineers]); and the *CPHPS Infrastructure Plan* (October 2009) prepared by Winzler & Kelly and Arup.

Water

III.Q.2 Setting

Regional Water System

The Project site is served by the San Francisco Public Utilities Commission, which manages a complex Regional Water System (RWS), stretching from the Sierra Nevada Mountains to San Francisco Bay Area and serving 2.5 million residential, commercial, and industrial customers in the Bay Area and Sierra Nevada

[993] One threshold provided under the Utilities and Service Systems section of Appendix G of the CEQA Guidelines specifically relates to stormwater (Criterion XIV(c)); this threshold is addressed in Section III.M (Hydrology and Water Quality) of this EIR.

[994] An April 28, 2010, Addendum to the Water Demand Memorandum #16—Variant 2A (Housing/R&D Variant) (dated October 15, 2009) is included as Appendix Q2 of this C&R document.

foothills.[995] The RWS can be thought of as consisting of three integrated water supply and conveyance systems: Hetch Hetchy, Alameda, and the Peninsula systems.

The RWS provides wholesale water service to twenty-seven Bay Area water agencies located in Alameda, San Mateo, and Santa Clara Counties (wholesale customers), and also provides retail water for the residents, businesses, and industries within the municipal boundaries of the City and County of San Francisco (retail customers). In addition, the retail customers also include San Francisco International Airport and San Francisco County Jail in San Mateo County, the unincorporated Town of Sunol, Lawrence Livermore Laboratory, Castlewood development in Alameda County, and Groveland Community Services District in Tuolumne County.

Auxiliary Water Supply System

The Auxiliary Water Supply System (AWSS) is a separate and distinct water supply system for fire protection purposes only. Candlestick Point and HPS Phase II are not currently served by the AWSS. Currently, there is a planned extension of the AWSS on Gilman Street from Ingalls Street to Candlestick Point. The Project would connect to this extension and provide an AWSS loop within Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road.

Sources of Water Supply

In Fiscal Year 2007/08 the RWS delivered an annual average of approximately 256.7 million gallons[996] of water per day (mgd), with approximately 85 percent of that water supply provided by the Hetch Hetchy system, which diverts water from the Tuolumne River. The balance (of approximately 15 percent[997]) comes from runoff in the Alameda Creek watershed, which is stored in the Calaveras and San Antonio reservoirs, and runoff from the San Francisco Peninsula, which is stored in the Crystal Springs, San Andreas, and Pilarcitos reservoirs (which also provide storage for water delivered from the Alameda and Hetch Hetchy systems). A small portion of retail demand is met through locally produced groundwater, used primarily for irrigation at local parks and on highway medians, and recycled water, which is used for wastewater treatment process water, sewer box flushing, and similar wash down operations. The SFPUC also retails groundwater (pumped from the Pleasanton well field) to the Castlewood development in Alameda County.

Water Supply Reliability Planning

To enhance the reliability of the RWS, improve dry-year supplies, diversify the water supply portfolio, and meet projected wholesale and retail demand through 2030, the SFPUC developed the Water Supply Improvement Program (WSIP), approved on February 28, 2005. Under the WSIP as originally developed, the SFPUC proposed to meet projected 2030 average daily purchase requests of 300 mgd in the RWS service area by increasing diversions from the Tuolumne River under its existing water rights and

[995] City and County of San Francisco, Public Utilities Commission (SFPUC) website, http://www.sfgov.org/site/frame.asp?u=http://www.sfwater.org/ accessed August 16, 2009.
[996] PBS&J, Water Supply Availability Study of City and County of San Francisco, October, 2009.
[997] Ibid.

developing 10 mgd of new local resources through a combination of additional conservation, water recycling and groundwater supply programs.[998] The WSIP proposed various water facility improvement projects to achieve stated public health, seismic safety, delivery reliability and water supply goals. The WSIP also included provisions for obtaining additional dry-year supplies. The Program Environmental Impact Report (PEIR) for the WSIP identified and analyzed potential impacts that would result from implementation of the WSIP, including the diversion of an additional 35 mgd annual average from the Tuolumne River, along with 3 variants and 6 alternatives, including various water supply combinations that could meet future demand. Impacts associated with the water supply decisions were analyzed at a project-level of detail. All facility projects, including construction of projects to implement proposed local water supply projects were analyzed at a program-level of detail. After certification of the FPEIR by the Planning Commission, on October 30, 2008, the SFPUC adopted a Phased WSIP option, which included the following program elements: (1) full implementation of all WSIP facility improvement projects; (2) water supply delivery to RWS customers through 2018 with an average annual target delivery of 265 mgd originating from the watersheds. This includes 184 mgd for wholesale customers and 81 mgd for retail customers; (3) water supply sources consisting of 265 mgd average annual from SFPUC watersheds, 10 mgd conservation, recycled water, and groundwater in San Francisco and 10 mgd conservation, recycled water, and groundwater in the wholesale service area; (4) dry-year water transfers coupled with the Westside Groundwater Basin Conjunctive Use project to ensure drought reliability; (5) re-evaluation of 2030 demand projections, RWS purchase requests and water supply options by 2018 and a separate SFPUC decision by 2018 regarding water deliveries after 2018; and (6) provision in the new Water Supply Agreement between the SFPUC and wholesale customers to impose financial penalties to limit water sales to an average annual 265 mgd from the SFPUC watersheds through 2018 (SFPUC Resolution No. 08-0200, October 30, 2008). Thus, under the Phased WSIP, SFPUC has voluntarily chosen to limit deliveries from the RWS surface water supplies, and by December 31, 2018, the SFPUC will reevaluate water demands and water supply options through 2030 in the context of then-current information.

The Phased WSIP would meet projected 2018 demand of approximately 285 mgd by capping deliveries from the RWS at 265 mgd, with 184 mgd allocated to wholesale customers and 81 mgd allocated to retail customers[999]. The remaining 20 mgd of demand would be met through water conservation, recycling and groundwater, with 10 mgd provided by wholesale customers and 10 mgd provided by local projects within San Francisco. Improved dry-year supplies would be provided via implementation of the Westside Groundwater Basin Conjunctive Use Project (in San Mateo County), and less than 2 mgd in water transfers. The 10 mgd of local supply committed to by the SFPUC upon adoption of the Phased WSIP would be provided through development of the local water supply improvements discussed below.

Local Water Supply Improvements

Groundwater

Early in its history, San Francisco made significant use of local groundwater, springs, and spring-fed surface water and in the 1930s pumping rates from the groundwater basin on the west side of the City were reported to be up to a total of 6 mgd. However, after the development of surface water supplies in the

[998] SFPUC, *Water Supply Improvement Program*, February 28, 2005.
[999] PBS&J, Water Supply Availability Study of City and County of San Francisco, October, 2009.[999] Ibid.

Peninsula and Alameda watersheds and the subsequent completion of the Hetch Hetchy system in the 1930s, the use of groundwater for the water supply system has been minimal.[1000]

San Francisco overlies all or part of seven groundwater basins, including the Lobos, Marina, Downtown, and South basins, located wholly within the City limits, and the Islais Valley, South, and Visitation Valley basins that extend south into San Mateo County. The portion of the Westside Basin aquifer located within San Francisco is commonly referred to as the North Westside Basin. Except for the Westside and Lobos basins, groundwater in the other basins is insufficient for municipal supply due to low yield[1001]. Local groundwater is used for irrigation purposes in some parks, as well as non-potable purposes at the San Francisco Zoo and Golden Gate Park.

SFPUC is currently studying implementation of the San Francisco Groundwater Supply Project (SFGSP), created as part of the WSIP, to expand use of the local ground water source to provide ongoing supply and to improve reliability during drought, maintenance conditions, earthquake, or other emergency. The SFGSP proposes the construction of up to six wells and associated facilities in the western part of San Francisco to extract up to 4 mgd of water from the North Westside Groundwater Basin for distribution in the City. The extracted groundwater would be treated, disinfected, and blended in small quantities with surface water supplies before entering the municipal drinking water system. The environmental review for this project is expected to begin in November 2009.

Recycled Water

From 1932 to 1981, San Francisco's McQueen Treatment Plant provided recycled water to Golden Gate Park for irrigation purposes. Due to regulatory changes, the City closed the McQueen plant and discontinued use of recycled water in Golden Gate Park. Currently, disinfected secondary-treated recycled water from the SFPUC's Southeast Water Pollution Control Plant is used on a limited basis for wash-down operations in the Combined Sewer Systems and is also provided to construction contractors for dust control and other construction purposes. Current use of recycled water for these purposes in San Francisco is less than 1 mgd.[1002]

In March 2006, the SFPUC updated the Recycled Water Master Plan (RWMP) for the City. The 2006 RWMP identified where and how San Francisco could most feasibly develop recycled water in the City and provided strategies for implementing the recycled water projects that were identified. The SFPUC plans to continue to diversify San Francisco's water supply portfolio by increasing the use of local water sources, such as recycled water, groundwater, water conservation, and desalination.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco. Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project.

[1000] SFPUC, *2005 Urban Water Management Plan for the City and County of San Francisco*, December 2005.[1000] UWMP 2005.
[1001] PBS&J, Water Supply Availability Study of City and County of San Francisco, October, 2009.[1001] Ibid.
[1002] Ibid.

The Westside Recycled Water Project would provide recycled water to several sites on the west side of San Francisco. The system would produce recycled water at a proposed recycled water treatment facility in Golden Gate Park and deliver the water to the San Francisco Zoo, Golden Gate Park, and Lincoln Park Golf Course for landscape irrigation and for non-potable uses at the Zoo and Golden Gate Park, including at the California Academy of Sciences. SFPUC has begun the project-specific environmental review for this project.

In addition, the SFPUC has partnered with the North San Mateo County Sanitation District (NSMCSD) to propose the Harding Park Recycled Water Project, which would use recycled water from the NSMCSD located in Daly City, to irrigate the Harding Park and Fleming Park golf courses in San Francisco. Completion of these projects are anticipated by the end of 2013 and would produce 2 million gallons of recycled water to irrigate Golden Gate Park, Fleming and Lincoln golf courses, Harding Park, and the San Francisco Zoo, along with commercial customers. Daly City is expected to complete the project-specific environmental review for the Harding Park Recycled Water Project in 2009. Currently, the SFPUC is conducting a recycled water demand assessment on the Eastside of San Francisco. The assessment examines the potential uses of recycled water for irrigation, toilet flushing, and commercial applications.

Water Conservation

The SFPUC's demand management programs range from financial incentives for plumbing devices to improvements in the distribution efficiency of the system. The conservation programs implemented by the SFPUC are based on the California Urban Water Conservation Council's list of fourteen Best Management Practices (BMP) identified by signatories of the Memorandum of Understanding Regarding Urban Water Conservation in California, executed in 1991. Refer to the WSA (Appendix Q1) for an assessment of BMP progress to date.

In addition, the SFPUC is increasing its water conservation programs in an effort to achieve new water savings by 2018, consistent with the Phased WSIP. This program is based on the 2004 San Francisco Retail Water Demands and Conservation Potential report[1003] (Demand Report) that identified potential water savings and implementation costs associated with a number of water conservation measures. These new conservation programs include high-efficiency toilet replacement in low-income communities and water efficient irrigation systems in municipal parks. With this expanded conservation program, the SFPUC anticipates reducing gross per household consumption (which includes both residents and non-residents) from 91.5 gallons per day (gpd) to 87.4 gpd by 2018, which would result in a conservation supply potential of approximately 4.0 mgd annually.

Water Treatment Capacity

Water from the Hetch Hetchy system is delivered to customers without filtration since the quality of this water supply has warranted a filtration exemption.[1004] Water from the Alameda system is treated at the Sunol Valley

[1003] Hannaford and Hydroconsult, City and County of San Francisco Retail Water Demands and Conservation Potential, 2004.

[1004] Current regulations providing for a filtration exemption under the Safe Drinking water Act are found in Surface Water Treatment Rule (54 FR 27486, June 29, 1989), as amended by the Long Term 1 Surface Water Treatment Rule (67 FR 1812, January 14, 2002) and the Long Term 2 Surface Water Treatment Rule (71 FR 654, January 5, 2006). EPA granted a filtration exemption to SFPUC in September 1993.

Water Treatment Plant (WTP). Peninsula system water and any Hetch Hetchy or Alameda system water stored in Peninsula reservoirs is treated at the Harry Tracy WTP. These treatment plants have existing treatment capacities of 160 mgd and 120 mgd, respectively. To ensure treatment capacity into the future, the SFPUC is currently completing the environmental review of a proposal to upgrade the Sunol Valley WTP to reliably treat 160 mgd and increase the storage capacity of treated water at the Sunol Valley WTP. The Sunol Valley Water Treatment Plant (SVWTP) Expansion and Treated Water Reservoir project is located in an unincorporated portion of Alameda County in the Sunol Valley within the SFPUC's Alameda watershed. The SFPUC is also currently designing an expansion of the Harry Tracy WTP to reliably deliver 160 mgd, which would increase the total treatment capacity of the RWS to 320 mgd. The Harry Tracy WTP, located in unincorporated San Mateo County, California, near the Cities of San Bruno and Millbrae, proposes improvements including improving water quality, increasing water delivery capability, and strengthening facilities with seismic upgrades. These projects would further the delivery reliability goals identified by the SFPUC as part of the Phased WSIP by allowing the SFPUC to deliver water to meet winter demands during maintenance and emergency supply in the event of loss of the Hetch Hetchy system supply. In addition, SFPUC has initiated construction of the Tesla advanced disinfection treatment facility in Tracy, California, to provide advanced disinfection of water from the Hetch Hetchy system. When completed in 2011, the Tesla advanced disinfection treatment facility would be the nation's largest ultraviolet disinfection treatment plant.

Water Shortage and Dry-Year Planning

Prior to the late 1970s, droughts did not seriously affect the ability of the SFPUC to sustain full deliveries to its customers. However, as the 1987-1992 drought progressed and reservoir storage continued to decline, it became apparent that continued full deliveries could not be sustained. To provide some level of assurance that water could be delivered continuously throughout a drought (although at reduced levels), the SFPUC subsequently adopted a drought planning sequence and associated operating procedures that trigger different levels of water delivery reductions relative to the volume of water stored in SFPUC reservoirs.

Each year, during the snowmelt period, the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS. If this evaluation finds the projected total water storage to be less than a level sufficient to provide sustained deliveries, the SFPUC may impose delivery reductions or rationing. The amount of the reduction is specified in contractual agreements between the SFPUC and wholesale customers, as detailed in the existing Water Shortage Allocation Plan (WSAP). The WSAP provides specific allocations of available water between the retail and wholesale customers associated with different levels of systemwide shortages. For retail customers, the provisions of shortage allocations are identified in the Retail Water Shortage Allocation Plan (RWSAP). Under the RWSAP, during a shortage of between 5 to 10 percent (Stage 1), SFPUC retail customers would experience no reduction in deliveries, but the SFPUC would issue a voluntary rationing request to customers, alert customers to water supply conditions, remind them of existing water use prohibitions, and provide education on, and possible acceleration of, incentive programs. For a shortage of between 10 to 20 percent (Stage 2), retail customers would experience a 1.9 percent reduction in retail deliveries. During Stage 2, all Stage 1 measures would be implemented, customers would receive a specific allotment of water, and if a customer's water use goes above their allotment, they would be subject to an excess use flow restrictor device and shut-off of water. For shortages in excess of 20 percent (Stage 3), all Stage 2 measures are implemented and additional reductions in retail allotments would be implemented, as determined by the SFPUC.

Current and Future Water Supplies

As discussed above, the Phased WSIP allocates 81 mgd to retail customers. In addition, approximately 3.5 mgd of groundwater is provided from local groundwater basins (to San Francisco parks, the San Francisco Zoo, Golden Gate Park, and Castlewood). Per the Phased WSIP, an additional 10 mgd would be provided from local groundwater and recycled water projects and from conservation measures that reduce demand. Table III.Q-1 (SFPUC Estimated Retail Water Supplies, 2010–2030) provides an estimate of retail water supplies between 2010 through 2030, which projects an increase from 84.5 mgd to 94.5 mgd.

Table III.Q-1 SFPUC Estimated Retail Water Supplies, 2010–2030

Water Supply Sources	*2010*	*2015*	*2020*	*2025*	*2030*
Current Water Supply Sources					
SFPUC RWS (Surface water: Tuolumne River, Alameda & Peninsula)[a]	81.0	81.0	81.0	81.0	81.0
Groundwater Sources					
Groundwater (In-City Irrigation Purposes)	2.5[b]	0.5[c]	0.5[c]	0.5[c]	0.5[c]
Groundwater at Castlewood[d]	1.0[d]	1.0[d]	1.0[d]	1.0[d]	1.0[d]
Groundwater: Treated for Potable—Previously used for In-City Irrigation purposes[e]	0.0	2.0	2.0	2.0	2.0
Groundwater Subtotal	*3.5*	*3.5*	*3.5*	*3.5*	*3.5*
Current Water Supply Subtotal	*84.5*	*84.5*	*84.5*	*84.5*	*84.5*
WSIP Water Supply Sources					
Groundwater Development: Potable from SF GWSP (Westside Groundwater Basin)[f]	0.0	2.0	2.0	2.0	2.0
Recycled Water Expansion Irrigation[g]	0.0	4.0	4.0	4.0	4.0
Supply Conservation Program	0.0	4.0	4.0	4.0	4.0
WSIP Supply Subtotal	*0.0*	*10.0*	*10.0*	*10.0*	*10.0*
Total Retail Supply (Current and WSIP Supplies)	***84.5***	***94.5***	***94.5***	***94.5***	***94.5***

SOURCE: PBS&J, *Water Supply Assessment for the Proposed Candlestick Point—Hunters Point Shipyard Phase II Project*, October, 2009.

a. RWS surface water supplies are subject to reductions due to below-normal precipitation. This may affect dry-year supplies—model shows supply reduction occurs in year 2 of multiple-dry-year event (Source: SFPUC 2008 WSIP Phase Variant Supply limitation).
b. Groundwater serves irrigation to Golden Gate Park, SF Zoo, and Great Highway Median.
c. A Groundwater reserve of 0.5 mgd for irrigation purposes would remain as part of SFPUC's non-potable groundwater supply.
d. Castlewood current and projected use remains unchanged over 20-year planning horizon.
e. 2.0 mgd of groundwater treated and blended for Potable water supply purposes.
f. 2.0 mgd of new groundwater developed as part of the new local supply target.
g. 2.0 mgd of Recycled used for irrigation at Golden Gate Park, SF Zoo, Great Highway Median, and 2.0 mgd for other non-potable purposes.

Current and Future Water Demand

To update the water supply and demand estimates provided in the 2005 update of the Urban Water Management Plan (UWMP), the SFPUC developed a Water Supply Availability Study (WSAS, included as an attachment to Appendix Q1). The WSAS incorporates new water supply information (per the Phased WSIP) and generates new estimates of future water demand for San Francisco. The future water demand estimates are based on the most current population and employment estimates, which include the Project and other major development proposals not anticipated in the 2005 UWMP.

The new demand estimates also incorporate the results of the 2004 Demand Report, which analyzed water demands associated with each retail customer sector and included development of a water use model. The water use model accounts for demand at the end use level (such as individual toilets and showers), and established water use rates for specific units, including multi-family residential households and employees, the latter of which is used to estimate non-residential water demands. The WSAS used an average of these water use rates over the next 20 years (2010–2030) to establish a water use rate for multi-family residential households of 98.7 gpd, and a water use rate for employees of 42.42 gpd. With these unit rates, future water demand can be estimated from changes in the number of residential households and/or employees in San Francisco.

To update future water demand, the WSAS compared the estimates of residential households and employees used in the 2005 UWMP with new population and employment forecasts provided by the San Francisco Planning Department,[1005] which were designed to closely match the recently adopted Association of Bay Area Governments (ABAG) Projections 2009 target, and taking into account local knowledge of projects currently in various stages of the entitlement process. Updated water demand estimates were then generated, which included the increment of future growth that was not previously included in the 2005 UWMP estimates.

Estimates of water demand for major development proposals in San Francisco were based on information provided by project proponents (including Lennar Urban for the Project). The water demand estimates were independently reviewed by PBS&J and the SFPUC as part of the WSAS and the Water Supply Assessment (WSA) prepared for the Project and determined to be consistent with the demand rates developed for the 2004 Demand Report.[1006]

Table III.Q-2 (Estimated Average Annual Retail Water Demand) provides an estimate of total SFPUC Retail Water Demands from 2010 through 2030, which incorporates the most recent new residential development estimates from 2015 through 2030, and assumes some development not previously included in the 2005 UWMP estimates. Total retail water demand, including Project demand, is estimated to increase from 91.81 mgd in 2010 to approximately 93.42 mgd by 2030.

To assess the adequacy of current and projected future water supplies to meet estimated future demand, including the demand associated with major development proposals, including the Project, and other projected future growth (e.g., background growth from ABAG projections), the WSA included a comparison of retail water supply and demand. Table III.Q-3 (Comparison of Projected Water Supply and Demand for Normal, Single Dry, and Multiple Dry Years [mgd]) provides a comparison of the projected future retail water supply and demand in varying hydrologic conditions over the 20-year planning horizon through 2030.

[1005] San Francisco Planning Department, Projections of Growth by 2030, July 9, 2009 (included as Appendix A to the Water Supply Availability Study).
[1006] PBS&J, *Water Supply Assessment for the Proposed Candlestick Point—Hunters Point Shipyard Phase II Project*, October 2009.

Table III.Q-2 SFPUC Estimated Average Annual Retail Water Demand

Users, Facilities, and Entities		*Projected Water Demand (mgd)* 2010	2015	2020	2025	2030
Residential Demand (Single and Multiple Family)[a]		44.70	43.80	43.20	42.90	42.90
New Residential Demand generated by Projects and Incremental Growth[b,d]		—	0.47	0.95	1.42	1.89
	Subtotal	*44.70*	*44.27*	*44.15*	*44.32*	*44.79*
Non-Residential - Business/Industrial Demands[c,d]		30.21	30.52	30.83	31.14	31.73
	Subtotal	*74.91*	*74.79*	*74.98[i]*	*75.46*	*76.52*
Unaccounted-for System Losses		7.30	7.30	7.30	7.30	7.30
	Subtotal	*82.21*	*82.09*	*82.28*	*82.76*	*83.82*
Other Retail Demands[e]		4.90	4.90	4.90	4.90	4.90
Lawrence Livermore Laboratory; Groveland CSD[f]		1.20	1.20	1.20	1.20	1.20
City Irrigation Demand[g]		2.5	2.5	2.5	2.5	2.5
Castlewood Community Demand[h]		1.0	1.0	1.0	1.0	1.0
	Total Retail Demand	***91.81***	***91.69***	***91.88[i]***	***92.36***	***93.42***

SOURCE: PBS&J, Water Supply Assessment for the proposed Candlestick Point/Hunters Point Shipyard Phase II project, October, 2009.

a. Residential Demands
b. Multiple Family Demand calculated as [2030 Incremental Growth of 0.24 mgd + (CP-HPS II 10,500 DU) 1.04 mgd + (TI-YBI 8,000 DU) 1.17 mgd + (Park Merced 8,900 total DU) 0.94 mgd = 3.40 mgd. With existing demand of 1.51 mgd at all three sites, net demand is (3.40 mgd – 1.51) 1.89 mgd.
c. Agriculture, Mining, Construction, Manufacturing, Transportation, Wholesale & Retail Trade, F.I.R.E., Services, Gov't including Builders – Contractors and Docks – Shipping, per 2009 ABAG Employment Projections updated dated from SF Planning (July 2009) Employment water demands calculated 42.42 gallons per employee per day.
d. Non-residential (jobs/employment) demands at major project sites were assumed to be contained in the 2009 ABAG Employment projections. Growth in demand is incrementally increased to reflect the growth in jobs over the 20-year planning horizon. To avoid double-counting the water demand associated with the 2009 SF Planning Non-Residential Employment Projections and the non-residential demand calculated in the developer estimates at each of the Project sites, the total water demand at each of the developments was adjusted to remove the non-residential demands. This study assumes all non-residential demand is accounted for in the 2009 SF Planning Non-Residential Employment Projections. Net change in water demand at the Project sites and the adjusted change in water demand without non-residential demand.
e. US Navy, SF International Airport, and other suburban/municipal accounts.
f. Lawrence Livermore Laboratories (0.8 mgd); Groveland CSD (0.4 mgd)
g. City Irrigation at Golden Gate Park, Great Highway Median and SF Zoo.
h. Castlewood Community demand served by wells in the Pleasanton well field.
i. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals; this table is consistent with Table 4-7 of the WSA.

Table III.Q-3 Comparison of Projected Supply and Demand for Normal, Single Dry, and Multiple Dry Years (mgd)

				Multiple Dry Year Event		
	Retail Supply and Demand	***Normal Year***	***Single Dry Year***	***Year 1***	***Year 2***	***Year 3***
2010	RWS Supply[a]	81.00	81.00	81.00	79.50	79.50
	Groundwater Supply[b]	3.50	3.50	3.50	3.50	3.50
	Total Retail Supply[c]	***84.50***	***84.50***	***84.50***	***83.00***	***83.00***
	Total Retail Demand[d]	91.81	91.81	91.81	91.81	91.81
	Surplus/(Deficit)[e]	-7.31	-7.31	-7.31	-8.81	-8.81
2015	RWS Supply[a]	81.00	81.00	81.00	79.50	79.50
	Groundwater[f]	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources[g]	10.00	10.00	10.00	10.00	10.00
	Total City Supply[c]	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand[d]	91.69	91.69	91.69	91.69	91.69
	Surplus/(Deficit)	2.81	2.81	2.81	1.31	1.31
2020	RWS Supply[a]	81.00	81.00	81.00	79.50	79.50
	Groundwater[f]	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources[g]	10.00	10.00	10.00	10.00	10.00
	Total City Supply[c]	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand[d]	91.87	91.87	91.87	91.87	91.87
	Surplus/(Deficit)	2.63	2.63	2.63	1.13	1.13
2025	RWS Supply[a]	81.00	81.00	81.00	79.50	79.50
	Groundwater[f]	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources[g]	10.00	10.00	10.00	10.00	10.00
	Total City Supply[c]	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand[d]	92.36	92.36	92.36	92.36	92.36
	Surplus/(Deficit)	2.14	2.14	2.14	0.64	0.64
2030	RWS Supply[a]	81.00	81.00	81.00	79.50	79.50
	Groundwater[f]	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources[g]	10.00	10.00	10.00	10.00	10.00
	Total City Supply[c]	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand[d]	93.42	93.42	93.42	93.42	93.42
	Surplus/(Deficit)	1.08	1.08	1.08	-0.42[h]	-0.42[h]

SOURCE: PBS&J, Water Supply Assessment for the proposed Candlestick Point/Hunters Point Shipyard Phase II project, October, 2009.

a. RWS Supply SFPUC Water Supplies
b. Groundwater Uses for In-City Irrigation and Castlewood.
c. Total Retail Supply from SFPUC Water Supplies
d. SFPUC Retail Demand
e. The deficit shown in 2010 is the result of reducing the RWS supply to 81 mgd as per the Phased WSIP Variant, without full development of the additional 10 mgd of new supplies. 10 mgd of new sources would be developed and available for use in SF by 2015. However, SF Retail demand is currently lower than projected (FY07/08 use was 83.9 mgd). If SF Retail demands exceed the available supply of 84.5 mgd between 2010 and 2015, the Water Supply Agreement allows the SFPUC to purchase additional water from the RWS. If combined Retail and wholesale deliveries exceed 265 mgd, the SFPUC Retail customers would be required to pay an Environmental Surcharge for deliveries over 81 mgd (Total RWS deliveries in FY07/08 were 256.7 mgd).
f. Groundwater Supplies at Castlewood and In-City Irrigation.
g. WSIP Supply Sources (Recycled Water (4.0 mgd; Groundwater (2.0 mgd Existing and 2.0 from NWGWP, and WSIP Water Efficiency and Conservation (4.0 mgd).
h. Deficit occurs in year 2 and 3 of multiple dry year event, SFPUC implements its Drought Year Water Shortage Contingency Plans - RWSAP and WSAP would be required to balance supply and demand under this projected shortfall.

The deficit shown in 2010 is the result of the Phased WSIP, which restricts the SFPUC's allocation from the RWS supply to 81 mgd. Full development of the additional 10 mgd of new local supplies is projected to be available by 2015. However, current retail demand is much lower than the estimated 2010 demand in Table III.Q-3 (actual Fiscal Year 07/08 demand was 83.9 mgd).[1007] If retail demand exceeds the available RWS supply of 81 mgd between 2010 and 2015, and total RWS deliveries exceed 265 mgd between 2010 and 2015, the Water Supply Agreement allows the SFPUC to purchase additional water from the RWS for retail customers in the SFPUC service area by paying an environmental surcharge (total RWS deliveries in FY07/08 were 256.7 mgd, which is 8.3 mgd below the 165 mgd watershed delivery goal).[1008] After 2015, when the additional 10 mgd local supply is projected to be completed, the WSA shows no expected deficit in supply. The first phase of development of the Project is projected to be completed in 2019. It is expected, therefore, that the Project would not contribute to any deficiencies in supply experienced by the SFPUC between 2010 and 2015.

As shown in Table III.Q-3, after 2030, during the second and third year of a multiple dry-year period, the projected water supply would be slightly less than the estimated total retail demand, including demand associated with the Project. Thus, during multiple dry-year periods, the SFPUC would need to implement the provisions of the WSAP and RWSAP, which could include voluntary rationing or the curtailment of retail deliveries. With the implementation of the WSAP and RWSAP during multiple dry-year periods, existing and projected future water supplies would be sufficient to meet estimated future water demand.

III.Q.3 Regulatory Framework

Federal

Safe Drinking Water Act

The basic regulations governing the RWS are associated with the federal and California *Safe Drinking Water Act*s. The federal *Safe Drinking Water Act*, passed in 1974 and amended in 1986 and 1996, is the nation's primary law regulating drinking water quality and is implemented by the USEPA. The Act authorizes the USEPA to set national health-based standards for drinking water and requires many actions to protect drinking water and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells. In addition to source water protection, the Act also provides for treatment, monitoring, sampling, analytical methods, reporting, and public information requirements. Implementation and enforcement of both the federal and California *Safe Drinking Water Act*s are under the jurisdiction of the California Department of Public Health (CDPH), Division of Drinking Water and Environmental Management. Drinking water regulations are set forth in the California Code of Regulations, Titles 17 and 22.

The amended federal S*afe Drinking Water Act* established phases of regulation and a number of regulatory deadlines to address drinking water requirements. This amended Act is implemented through subsidiary rules for regulation of specific contaminants or for monitoring or treatment requirements (USEPA 2007). The major USEPA drinking water regulations are listed below:

- Surface Water Treatment Rule
- Interim Enhanced Surface Water Treatment Rule

[1007] PBS&J, October 2009.
[1008] PBS&J, October 2009.

- Total Coliform Rule
- Stage 1 Disinfectants and Disinfection Byproducts Rule
- Stage 2 Disinfectants and Disinfection Byproducts Rule
- Long Term 1 Enhanced Surface Water Treatment Rule
- Long Term 2 Enhanced Surface Water Treatment Rule
- Variances and Exemptions Rule
- Lead and Copper Rule
- Radionuclides Rule
- Filter Backwash Recycling Rule
- Arsenic Rule
- Public Notification Rule

State

Water Conservation Projects Act

California's requirements for water conservation are codified in the *Water Conservation Projects Act of 1985* (Water Code Sections 11950–11954), as reflected below:

> Section 11952(a). It is the intent of the Legislature in enacting this chapter to encourage local agencies and private enterprise to implement potential water conservation and reclamation project.

Urban Water Management Planning Act

Section 10610.4 of the *California Urban Water Management Planning Act* specifies that "Urban Water Suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies." The SFPUC prepared and adopted the current Urban Water Management Plan in December 2005.

Water Code Sections 10910 et seq. (Senate Bill 610)

Effective January 1, 2002, the State of California, through Senate Bill 610 (SB 610), adopted a requirement that a city or county, and the associated public water system, prepare a Water Supply Assessment (WSA) for projects that meet certain criteria, including (1) a project creating the equivalent demand of 500 residential units, (2) a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space, and (3) a commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space. The Project meets the criteria for requiring a WSA because it meets all of the criteria listed above.

In an effort to streamline the water supply planning process within San Francisco, the SFPUC adopted resolutions in 2002 and 2006 to allow for all development projects requiring a WSA under SB 610 (qualifying projects) to rely solely on the adopted UWMP without having to go through the process of preparing individual WSAs. Because the Planning Department and Agency are currently engaged in planning for various proposed land development projects that go beyond the future developments considered in the 2005 UWMP update, the SFPUC concluded that its 2005 UWMP no longer accounted for every qualifying project in San Francisco. Therefore, until the 2010 UWMP is prepared, any qualifying projects not accounted in the 2005

UWMP, including the Project, would require preparation of a WSA that considers the SFPUC's current and projected supplies when compared to projected demands associated with new growth not covered in the 2005 UWMP. The WSA prepared for the Project is included in Appendix Q1.

Water Code Section 73504(b)

Water Code Section 73504(b) requires the SFPUC to assign higher priority to delivery of water to the Bay Area than to the generation of electric power.

Local

San Francisco Green Building Ordinance

To minimize the use and waste of energy, water, and other resources in the construction and operation of buildings, to provide a healthy indoor environment, and to reduce greenhouse gas emissions, in 2008 the Board of Supervisors adopted the Green Building Ordinance, which applies to newly constructed residential and commercial buildings and renovations to existing buildings. The Ordinance specifically requires a minimum reduction of 20 percent in potable water use, rising to a minimum of 30 percent reduction in potable water use by 2011 for high-rise residential buildings, mid-size commercial buildings, and large commercial buildings (as defined in the Ordinance). In addition, the Ordinance also requires a minimum reduction of 50 percent in the use of potable water for landscaping for high-rise residential, mid-size commercial, and large commercial buildings.

III.Q.4 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts related to water, but generally consider that implementation of the Project would have significant impacts on this resource if it were to:

Q.a Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects

Q.b Require new or expanded water entitlements and resources, if there are not sufficient water supplies available to serve the project from existing entitlements and resources[1009]

Analytic Method

The analysis in this section focuses on the potential for a change in existing and projected water use as a result of Project implementation. The primary resources used for this analysis include the following technical documents: *Candlestick Point / Hunters Point Shipyard Phase II Water Demand Memorandum* (October 15, 2009) prepared by Arup; *Water Supply Assessment for the Proposed Candlestick Point—Hunters Point Shipyard Phase II Project* (October 2009), prepared by PBS&J; *Water Supply Availability Study of City and County of San Francisco* (October 2009) prepared by PBS&J; *SFPUC Urban Water Management Plan* (December 2005),

[1009] This standard has been slightly modified from the text found in CEQA Guidelines, Appendix G, for ease of comprehension.

prepared for the SFPUC; and the *Final Programmatic Environmental Impact Report for the Water System Improvement Program* (October 2008), prepared by the San Francisco Planning Department.

This section includes an evaluation of whether existing water treatment facilities have sufficient treatment capacity to serve the Project, and whether an adequate and reliable source of water would be available to serve the Project, both of which require an estimate of water demand that would result from Project implementation.

Estimates of water demand for the Project were developed for Lennar Urban by Arup[1010] and are summarized in Table III.Q-4 (Project Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance [mgd]). Water demand for the Project was derived from an estimate of a historical benchmark demand, adjusted to account for current California Building Codes and an additional adjustment to account for the requirements of the San Francisco Green Building Ordinance, including the installation of ultra-low flow fixtures, the use of high-efficiency building equipment, and efficient landscape irrigation techniques. An independent analysis performed as a part of the WSA, which analyzed similar land uses and assigned a demand factor for each use, concluded that the demand estimates provided by Arup are consistent with SFPUC demand factors.

Table III.Q-4 Project Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance (mgd)

Land Use	*Candlestick Point*	*Hunters Point Shipyard Phase II*	*Total*
Residential	0.61	0.22	0.83
Hotel	0.05	0.00	0.05
Office	0.04	0.02	0.06
R & D	0.00	0.36	0.36
Neighborhood Retail	0.02	0.02	0.04
Regional Retail	0.08	0.00	0.08
Community Uses	0.01	0.01	0.02
Football Stadium	0.00	0.02	0.02
Performance Venue	0.01	0.00	0.01
Subtotal	*0.82*	*0.65*	*1.47*[a]
Parks and Open Space	0.06	0.15	0.21
Total Demand	***0.88***	***0.70***[a]	***1.67***[a]

SOURCE: Arup, Candlestick Point–Hunters Point Shipyard Phase II Water Demand Memorandum, October 15, 2009.

a. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals used in this table. These entries are correct and consistent with Table 4-3 of the Water Supply Assessment.

Current land uses within the Project site include residential (Alice Griffith Public Housing) and recreational (including the Candlestick Point State Recreation Area [CPSRA] and Candlestick Park stadium), and a mostly vacant former shipyard. According to water meter readings from the Project site, current water use is approximately 0.3 mgd.[1011] Thus, based on a total estimated Project-related demand of 1.67 mgd (per

[1010] Arup, Candlestick Point/Hunters Point Shipyard Phase II Water Demand Memorandum, October 15, 2009.
[1011] PBS&J, October 2009.

Table III.Q-4) and current water use of 0.3 mgd from existing land uses, the net impact of the Project on water demand would be an increase of approximately 1.37 mgd.

Existing and projected future water supplies for SFPUC retail customers were compared with estimated future demand to determine whether water supplies would be sufficient to meet Project-related demands. The current status of ongoing water supply improvements was also assessed, to determine whether the anticipated future water sources would be available.

The current and planned treatment capacity of existing water treatment facilities was also reviewed to determine whether sufficient capacity exists to provide water treatment service to the Project.

Construction Impacts

Significance Criterion Q.a, above, indicates that the Project would have a significant adverse effect if it would require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. The Infrastructure Plan for the Project would include a low-pressure water system, a reclaimed water system, an AWSS, and separate sanitary sewer and storm drainage facilities. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), Section III.J (Cultural Resources and Paleontological Resources), Section III.K (Hazards and Hazardous Materials), Section III.L (Geology and Soils), Section III.M (Hydrology and Water Quality), Section III.O (Public Services), and Section III.S (Greenhouse Gas Emissions) of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of water conveyance or treatment infrastructure associated with the Project.

The water required for construction activities is assumed to be supplied by water trucks and/or existing sources. No construction-related impacts associated with the consumption of water would occur with the Project.

Operational Impacts

Although other sections of this EIR provide separate impact assessments for development at Candlestick Point and HPS Phase II, segregating the discussion of impacts on water treatment facilities and water supplies would not provide any additional meaningful information. Thus, for the purposes of clarity, this section only provides an assessment of Project impacts, which includes both components of the Project.

Impact UT-1: New or Expanded Water Entitlements and Resources

Impact UT-1 **Implementation of the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements. (Less than Significant) *[Criterion Q.b]***

Implementation of the Project would generate a total demand of approximately 1.67 mgd (per Table III.Q-4). This demand is based on an estimate of a historical benchmark demand, adjusted to account for current California Building Codes and the requirements of the San Francisco Green Building Ordinance, which would require the installation of ultra-low flow fixtures, use of high-efficiency building equipment, efficient landscape irrigation techniques, and provision of water-efficient plant materials. As

current water use from existing land uses at the Project site is approximately 0.3 mgd, the net effect of the Project on water demand would be an increase of approximately 1.37 mgd.

The Phased WSIP allocates 81 mgd from the RWS to retail customers. An additional 3.5 mgd of groundwater is provided from local groundwater basins. An additional 10 mgd would be provided from additional groundwater and recycled water projects, and from conservation measures that reduce demand (which the SFPUC identifies as a conservation supply). Total SFPUC retail water supply is estimated to vary between 93 and 94.5 mgd, depending on hydrologic conditions (per Table III.Q-1). Total future retail demand, including Project-related demand, is projected to increase from 91.81 mgd in 2010 to 93.42 mgd in 2030 (per Table III.Q-2). At the time of the first phase of Project implementation, sometime after 2015, SFPUC projects that adequate supply would be available to satisfy all retail demand, including Project-related demand, under normal conditions.

A comparison of total retail water supply to estimated water demand (per Table III.Q-3) shows that after 2030, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the Project. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand of approximately 1.37 mgd. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1012] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The local water supply projects, described in the setting, include: the San Francisco Groundwater Supply Project; the Westside Recycled Water Project; the Eastside Recycled Water Project, the Harding Park Recycled Water Project, and various conservation efforts. Collectively, these projects are estimated to provide approximately 10 mgd.[1013,1014] Of these projects, environmental review has been completed for the Harding Park Projects, and will soon be initiated for the other projects. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

[1012] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.

[1013] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.

[1014] SFPUC, Urban Water Management Plan, 2005.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant. No mitigation is required.

Impact UT-2: Construction of New or Expansion of Existing Water Treatment or Conveyance Facilities

Impact UT-2 **Implementation of the Project would not require or result in the construction of new or expanded water treatment facilities. The Project would require the expansion of an auxiliary water conveyance system to provide adequate water supply for firefighting to the Project site. (Less than Significant with Mitigation) *[Criterion Q.a]***

SFPUC determined in developing the WSIP that while it was meeting its core mission to serve San Francisco and its Bay Area customers with reliable, high-quality and affordable water, a long-term program was needed to reliably meet its mission in the future. The WSIP identified facility projects that would allow it to meet water supply, delivery reliability, seismic safety and water quality goals. In adopting the Phased WSIP, the SFPUC committed to implementing all of the identified facility projects, all of which underwent programmatic environmental review in the WSIP PEIR. As explained earlier, two of those projects would assist the SFPUC in meeting delivery reliability goals established for its two treatment plants. These projects are now undergoing project-level environmental review. It also identified a facility to provide for advanced disinfection of water from the Hetch Hetchy system, a project now under construction.

In addition, per SFPUC approval of the Phased WSIP, the SFPUC is proceeding to develop an additional 10 mgd of local supply from local recycled water and groundwater projects and additional conservation measures. The SFPUC is now in the planning and project-level review stage of these facility projects. Treatment requirements for these sources of water are included in the scope of those facility projects.

All of the projects identified above are planned for implementation irrespective of whether the Project is approved. As indicated in Table III.Q-3, water supply with the projects planned under the Phased WSIP would be sufficient in future years to meet normal demand, which includes Project demand. Implementation of the Project would not affect the treatment requirements of either of those sources of water. The groundwater and recycled water projects are in the planning and project-level environmental review phase now and are expected to be implemented before the first phase of the Project is expected to be completed. Implementation of water conservation measures, including those provided as part of the Project would reduce demand for water and would, therefore, not affect the treatment capacity of existing or proposed water treatment facilities.

As the current and planned facility projects under the Phased WSIP would provide for sufficient treatment capacity for the water to be supplied under the Phased WSIP and the Phased WSIP supply is sufficient to serve the Project, implementation of the Project would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant. No mitigation is required.

The Hunters Point Shipyard Reuse Environmental Impact Report (SCH #95072085, certified February 8, 2000) determined that the existing water system has insufficient pressure for adequate fire protection in certain portions of the Project site. The Project would expand the existing off-site AWSS by providing an AWSS loop at Candlestick Point that would connect to the planned extension of the existing off-site AWSS on Gilman Street from Ingalls Street to Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road.

The following mitigation measure shall be implemented:

MM UT-2 *Auxiliary Water Supply System. Prior to issuance of occupancy permits, as part of the Infrastructure Plan to be approved, the Project Applicant shall construct an Auxiliary Water Supply System (AWSS) loop within Candlestick Point to connect to the City's planned extension of the off-site system on Gilman Street from Ingalls Street to Candlestick Point. The Project Applicant shall construct an additional AWSS loop on HPS Phase II to connect to the existing system at Earl Street and Innes Avenue and at Palou and Griffith Avenues, with looped service along Spear Avenue/Crisp Road.*

This AWSS would ensure the provision of adequate water for on-site fire-fighting purposes, and the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements for water to fight fires. The impact is less than significant with implementation of this mitigation measure.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts to water resources is the service area of the Regional Water System (RWS) operated by the SFPUC. The past and present water supply and water treatment capacity in the RWS service area is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable development includes future growth incorporated into the 2005 Urban Water Management Plan, and the updated demand projections included in the WSA (dated October, 2009) which included updated projections for San Francisco developed by San Francisco Planning Department (*Projections of Growth by 2030*, dated July 9, 2009).

Water in the Project area is provided by the SFPUC, which manages the RWS and provides wholesale water service to 27 Bay Area water agencies located in Alameda, San Mateo and Santa Clara Counties (wholesale customers), and retail water for the residents, businesses, and industries within the municipal boundaries of the City and County of San Francisco (and various other customers in San Mateo, Alameda, and Tuolumne Counties).

To enhance the reliability of the RWS, improve dry-year supplies, diversify the water supply portfolio, and meet projected wholesale and retail demand through 2030, the SFPUC developed the WSIP, which proposed a program of facility improvement and water supply improvement projects to accommodate a projected increased in annual average demand from 265 mgd to 300 mgd. The SFPUC subsequently adopted the Phased WSIP to implement the facility improvement projects that would meet public health, seismic safety, and delivery reliability goals, but with phased implementation of the water supply program, with an additional supply of 20 mgd from recycled water, groundwater and conservation projects proposed

to meet projected demand through 2018. By December 31, 2018, the SFPUC must re-evaluate water demands and water supply options and allocate available water supplies to meet the demand through 2030.

Per the Phased WSIP, retail water supplies to San Francisco, including the Project area, are comprised of deliveries from the RWS, groundwater, and the identified local water supply improvement projects. With these sources, retail water supplies are estimated to vary between 93 and 94.5 mgd (as shown in Table III.Q-1), depending on hydrologic conditions. Total retail water demand, including demand from the Project, several major development proposals (as discussed in the WSA), and background growth from ABAG projections and the 2005 UWMP is estimated to increase from 91.81 mgd in 2010 to approximately 93.42 mgd by 2030 (per Table III.Q-2).

When average annual retail water supply and demand are compared (in Table III.Q-3), after 2030, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including the cumulative demand associated with the Project, major development proposals, and background growth. During multiple dry-year periods, the SFPUC would need to implement the provisions of the WSAP and RWSAP, which could include voluntary rationing or the curtailment of retail deliveries. With the implementation of the WSAP and RWSAP during multiple dry-year periods, existing and projected future water supplies could accommodate cumulative future retail water demand.

Implementation of the Phased WSIP would ensure sufficient water supply and water treatment capacity for the Project and estimated current and future retail demand. Provision of an AWSS on site and connection to the existing off-site AWSS by implementation of mitigation measure MM UT-2 would ensure adequate water for firefighting purposes. As no additional water supply or water treatment capacity is needed to serve the Project and projected future development beyond the supply identified under the Phased WSIP, the Project would not make a considerable contribution to a cumulative impact on water supply. The Project's cumulative impact on water supply is less than significant.

Wastewater

III.Q.5 Setting

San Francisco Combined Sewer System

Project Site

At Candlestick Point, the Candlestick Park stadium and Alice Griffith public housing site contribute to the Combined Sewer System, while the Candlestick Point State Recreation Area (CPSRA) and portions of the stadium parking lots have separate storm sewer systems. Stormwater at HPS Phase II does not flow to the City's Combined Sewer System, but is discharged to the Bay via separate stormwater system outfalls and overland flows.

Overview

Most stormwater runoff in the City is collected via a Combined Sewer System, managed by the SFPUC. This system combines stormwater runoff and wastewater flows in the same network of pipes (Combined Sewer System), conveying flows to facilities where they are treated prior to discharge to the Lower Bay or

Pacific Ocean through outfall structures along the shoreline. Discharges into the combined sewer are regulated under two individual National Pollutant Discharge Elimination System (NPDES) permits (waste discharge requirements [WDRs]) issued by the RWQCB as discussed in the Regulatory Framework. The City is divided into two major drainage areas: Oceanside and Bayside. The Project site is in the Bayside Drainage Area. This area is further divided into subbasins: North Shore, Channel, Islais Creek, Yosemite, and Sunnydale, all of which flow to the Southeast Water Pollution Control Plant (SWPCP). The North Point Wet Weather Treatment Facility (NPWWTF), located on Bay Street, operates only during wet-weather conditions to treat combined storm flows. Figure III.M-1 (Combined and Separate Storm Sewer System and Receiving Water Bodies) in Section III.M depicts the wastewater infrastructure that serves the City and the Project site, including an illustration of the areas that are currently served by the combined sewer and stormwater system and areas that are served by a separate sewer and stormwater system.

The capacity of the system, along with treatment and pumping capacities, is based on design criteria imposed by the RWQCB in the City's NPDES permits that were calculated for the purpose of protecting beneficial uses and achieving compliance with water quality standards, based on 70 years of annual rainfall data. The design criteria required construction of control facilities designed to store and treat enough wastewater to limit wet-weather discharges to an annual long-term average of 10, 8, 4, or 1, depending on the location of the discharge. In the Project vicinity, the wet-weather facilities have been designed and constructed to achieve a long-term annual average of 1 discharge to ensure that most wastewater receives secondary treatment (removal of settleable materials and partial removal of dissolved materials).

Dry Weather

During dry weather, wastewater and any dry-weather runoff (e.g., irrigation runoff, discharge from underground springs, or pipe leaks) from the eastern portion of the City are conveyed to the SWPCP, at Phelps Street between Jerrold and Evans Avenues, just northwest of the Project site (refer to Figure III.M-2 [Major Water Quality Features]). The SWPCP treats approximately 67 million gallons per day (mgd) during dry weather (approximately 80 percent of the City's total wastewater flow)[1015] to a secondary treatment standard, with a total capacity to treat 150 mgd. Secondary treatment uses pure oxygen to encourage growth of microorganisms that consume organic material and improve the purity of the wastewater. Wastewater is then put into a second round of settling tanks where the microorganisms are separated from the purified water. Effluent is disinfected and dechlorinated before discharge. Treated wastewater is then discharged through the Southeast Plant deep water outfall at Pier 80 or through the Quint Street outfall to the Islais Creek Channel.

The Combined Sewer System also includes the Bayside Wet Weather Facilities (BWWF), which consist of interconnected large underground rectangular tanks and tunnels with a series of baffles and weirs that are designed to remove settleable solids and floatables. During dry weather, the BWWFs transport combined stormwater and wastewater to the SWPCP.

[1015] San Francisco Public Utilities Commission, website: http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/117/MTO_ID/225, accessed July 22, 2009.

Wet Weather

At full wet-weather capacity, discharge at the Pier 80 outfall is maximized to 110 mgd; a blend of 100 mgd primary treatment and 10 mgd secondary treatment. The remaining 140 mgd receiving secondary treatment is discharged via the Quint Street shallow water outfall into Islais Creek Channel, which occurs an average of 600 hours per year.

The NPWWF is operated on a seasonal, as-needed basis to supplement the treatment capacity of the SWPCP. During larger storm events, excess flows that cannot be treated at the SWPCP are treated at the NPWWF, at 111 Bay Street, about 3.5 miles north of the Project site, which provides primary treatment and disinfection capacity for an additional 150 mgd of wet-weather flows. The treatment process at the NPWWF consists of primary sedimentation, clarification, floatables removal, disinfection, and dechlorination operations. It treats only wet-weather flow that consists of domestic and industrial wastewater mixed with stormwater runoff to a maximum capacity of 150 mgd. Treated flows from this facility are discharged through four deep-water outfalls, approximately 800 feet from the Bay shoreline and 18 feet below mean low water. Two of the deep-water outfalls terminate at the end of Pier 33, and two terminate at the end of Pier 35 on the northeastern Bay.

If the combined wet-weather flows exceed 150 mgd, the NPWWF can also treat an additional 100 mgd to a primary treatment standard (removal of settleable materials) plus subsequent disinfection and dechlorination.[1016] Wet weather flows that are treated to the primary standard (plus disinfection) are only discharged from the Southeast Pollution Control Outfall (Pier 80 outfall). San Francisco operates the only municipal wastewater facilities in California where, on an annual basis, approximately two-thirds of the stormwater runoff receives secondary treatment.

The Bayside Wet Weather Facilities, during wet-weather conditions, provide storage and treatment that is equivalent to wet weather primary treatment. During wet weather, the underground transport tunnels provide a total storage capacity of approximately 193 million gallons, while pumps continue to transfer combined wastewater and stormwater to the SWPCP. When the combined capacity of the SWPCP and the NPWWF is exceeded, the wet weather facilities retain storm flows for later treatment. The tanks allow floatable and settleable solid materials to be removed, similar to primary treatment processes. The materials retained in the storage and transport boxes are flushed to the treatment plants after storms.

This level of treatment meets the minimum treatment specified by the USEPA Combined Sewer Overflow Control Policy (CSO Policy) I50 FR 18688; April 11, 1994. In the event that the capacities of the SWPCP, the NPWWF, and wet weather facilities and storage structures are exceeded, the combined stormwater and sewage, after receiving the equivalent of wet weather primary treatment in the transport structures/boxes, is discharged into San Francisco Bay through any one of the 29 shoreline combined sewer overflow (CSO) structures. The outfalls associated with these CSO structures are very wide diameter pipes or box culverts. All solids that settle out in the storage/transport structures are flushed to the SWPCP after the rainstorm subsides.

During large storm events that cause the flow in the SWPCP to exceed 110 mgd, the complete filling of the treatment and storage capacities of the combined system cause excess flows to receive "flow-through

[1016] San Francisco Public Utilities Commission, 2008. *System Overview: Wastewater System Map.* Accessed online November 6, 2008 at: http://sfwater.org.

treatment," similar to primary treatment, to remove settleable solids and floatable materials. Flows are then discharged into the Bay, through any one of 29 CSO structures located along the City's Bayside waterfront from Fisherman's Wharf to Candlestick Point. The volume of a CSO discharge is a function of the storm intensity, storm duration, treatment rate, and available storage. CSO discharges typically consist of about six percent sewage and 94 percent stormwater.[1017] All solids that settle out in the storage/transport structures are flushed to the SWPCP after the rainstorm. There are six CSO structures in the vicinity of the Project site, in Yosemite Slough (South Basin) and Candlestick Cove. Figure III.M-2 in Section III.M shows the location of the CSO structures relative to the Project site.

Table III.M-1 shows a summary of CSO events that occurred in 2006 by discharges from the SWPCP, NPWWP, and BWWF. CSOs 040 through 043, which are adjacent to the Project site at Yosemite Slough and South Basin, had two CSO events per outfall. Treatment plant and CSO discharge points are shown on Figure III.M-2.

SFPUC Five-Year Wastewater Capital Improvement Program

The SFPUC launched the Wastewater Enterprise Interim Capital Improvement Program (Interim CIP) to address the immediate needs of San Francisco's wastewater system. These special projects are aimed at reducing flood risk, reducing wastewater odors, and improving treatment facilities. The Interim CIP addresses immediate critical needs while a long-term comprehensive capital plan is developed through the SFPUC's strategy review. Several Interim CIP projects are currently under construction, including the Channel Pump Station Improvements Project, Southeast Wastewater Treatment Plant Gas Handling Improvements - Phase 2, Oceanside Wastewater Treatment Plant Aging Infrastructure Project (Ventilation Improvements), and the Southeast Wastewater Treatment Plant Digester Odor Improvement - Phase 1.

Biosolids Environmental Management System

Biosolids are nutrient-rich organic materials resulting from the biological and physical treatment of wastewater in a treatment facility. San Francisco produces over 80,000 tons of biosolids a year that are transported to landfills in Alameda, Contra Costa, and Solano counties and two land application sites in Solano and Sonoma counties. To ensure environmentally sound disposal of biosolids, San Francisco has committed to prepare and implement an Environmental Management System (EMS), a voluntary program that would implement best management practices developed by the National Biosolids Partnership for odor, traffic, noise, and dust control, as well as the management of nutrients.

Bayside Systems and Facilities Operations Plan (2002)

The Master Plan for wastewater management completed in 1971 and modified in 1982 included the Bayside Transport/Storage System (Bayside System), consisting of expansion of the SWPCP, completion of the Bayside Core System (Griffith Pump Station and Yosemite Facilities), and construction of the Sunnydale Facilities, Mariposa Facilities, and Islais Creek Facilities, each of which was completed at various times but all by 1997. The City's NPDES permit (see Regulatory Framework, below) requires the City to prepare a systems and facilities Operations Plan that will:

[1017] City and County of San Francisco, Public Utilities Commission, and Port of San Francisco, 2009, op. cit.

- Maximize the volume of wastewater treated at either the Southwest treatment plant or the North Point Wet Weather Facility and discharged via deep water outfalls, consistent with the hydraulic and treatment capacities of the Discharger's storage, transport, and treatment facilities
- Ensure that all discharges from the diversion structures are first baffled to reduce floatables volumes

The Bayside Systems and Facilities Operations Plan describes the operations strategy that will be implemented to meet these objectives.

Project Site Wastewater System

Within Candlestick Point, the CPSRA and portions of the paved areas around the Candlestick Park stadium are served by separate wastewater and stormwater systems that drain to the Bay. Other portions of Candlestick Point, including the Alice Griffith Public Housing site and Candlestick Park stadium itself, currently contribute both wastewater and stormwater to the Combined Sewer System. The Project site is served by the Bayside Transport/Storage System in the southeast drainage area, which consists of the Hunters Point and Yosemite Transport Systems, Griffith Pump Station, and Sunnydale Transport and Pump Station Facilities.[1018] The storage/transport system holds the combined sewage and stormwater for later treatment at the wastewater treatment plant and is sized to accommodate both dry- and wet-weather flows. The storage/transport system provides some treatment by settling out solids and skimming of floatables. It is primarily used for storage during and after storms, but also provides storage in the event of a power failure. Catch basins collect stormwater runoff from City streets and discharge runoff into the Combined Sewer System. If the capacity of sewer pipes is exceeded during storms, excess flow is directed to the storage/transport boxes. Approximately one to ten times per year, a storm exceeds the capacity of the storage/transport box, and a discharge (CSO) occurs (refer to Section III.Q.5 [Setting]).

Sunnydale transport/storage box and pump station facilities are used only for wet weather. During wet weather, combined sewage is diverted from the gravity system to the transport system, with a storage volume of 5.7 million gallons, and then flows to the Sunnydale Pump Station, which has a capacity of 50 mgd.

Wastewater from Candlestick Point combines with flows from the Sunnydale Facilities in the Candlestick tunnel sewer prior to entering the Yosemite Transport System, then flowing to the Griffith Pump Station. The present average dry-weather flow through the Candlestick tunnel sewer entering the Yosemite Transport System is 6 mgd, including that from the Sunnydale watershed. The Yosemite Transport System and existing sewers have a storage volume of 11.5 million gallons and convey dry- and wet-weather flows from the Yosemite/Fitch area and Sunnydale area to the Griffith Pump station. The Griffith Pump Station receives all Sunnydale and Yosemite/Fitch discharges via gravity flow, which is then pumped to the Hunters Point tunnel sewer. Pumping capacities for the Griffith Pump Station are 10 mgd in dry weather and 120 mgd in wet weather. Dry-weather flows from the Griffith Pump Stations are relatively small.[1019] The South Basin and Hunters Point flows enter the SWPCP at Rankin Street.

[1018] City and County of San Francisco, Public Utilities Commission, Bayside Systems and Facilities Operations Plan, 2002.
[1019] City and County of San Francisco, Public Utilities Commission, Bayside Systems and Facilities Operations Plan, 2002.

Existing residential uses in Candlestick Point generate approximately 76,800 gpd[1020] of wastewater to the Combined Sewer System, while football games and other events at the Candlestick Park stadium generate up to 280,000 gpd[1021] of wastewater on event days (assuming a sold-out event). The volume of flows from the Alice Griffith Public Housing site and portions of the parking lots surrounding Candlestick Park stadium is unknown, as the SFPUC does not monitor volumes from individual land uses or areas. However, this flow would be included in the existing baseline flows routed to the SWPCP. Wastewater flows from the HPS Phase II site are minimal, as sewage lines are no longer in use in this area, with the exception of waste from the artists' studios. Based on meter data from January 2000 to August 2002, the HPS Phase II site generated an average of 0.154 mgd of wastewater flow. Thus, the majority of the HPS Phase II does not currently contribute notable wastewater to the Combined Sewer System. The Navy is removing the entire wastewater system at Hunters Point Shipyard as part of its environmental remediation program.

The Candlestick tunnel sewer has an average daily dry-weather flow of 2.5 mgd (1,736 gpm) and a design capacity of 50 mgd (34,722 gpm).[1022] The Hunters Point tunnel sewer has an average dry-weather flow of 6 mgd (including the 2.5 mgd from the Candlestick tunnel sewer) (4,167 gpm) and a design capacity of 120 mgd (83,333 gpm).[1023]

III.Q.6 Regulatory Framework

In the Project site, water resources policies are administered by several agencies, including the RWQCB; the State Water Resources Control Board (SWRCB), and the USEPA. Development of the Project is subject to the federal *Clean Water Act*, the California *Porter-Cologne Water Quality Control Act* (Porter-Cologne Act), applicable *Water Code* sections (plans and policies adopted by the SWRCB and RWQCB); and permitting and licensing requirements that occur during development review by the City and County of San Francisco.

Federal

Clean Water Act

The 1972 amendments to the federal *Clean Water Act* (CWA) prohibit the discharge of pollutants to navigable waters from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The RWQCB issue NPDES permits for stormwater and wastewater outfalls (point sources). Issued by the RWQCB in five-year terms, an NPDES permit contains discharge prohibitions, effluent limitations, and necessary specifications and provisions that ensure proper treatment, storage, and disposal of the waste. The permit often contains a monitoring program that establishes monitoring stations

[1020] Calculated as 256 units and 300 gallons per day, using the residential wastewater generation factor from the *Candlestick Point/ Hunters Point Shipyard Infrastructure Concept Report* (2007) prepared by Winzler & Kelly Consulting Engineers.
[1021] Calculated as 70,000 seats (in football configuration) and 4 gallons per seat day per day, per the wastewater generation rate for stadium uses in the Final Environmental Impact Report for the Los Angeles Coliseum Renovation Project, November 21, 2003 (SCH# 1990011065).
[1022] City and County of San Francisco, Public Utilities Commission, Bayside Systems and Facilities Operations Plan, 2002.
[1023] City and County of San Francisco, Public Utilities Commission, Bayside Systems and Facilities Operations Plan, 2002.

at effluent outfalls and receiving waters. NPDES permits are individually issued for point-source discharges, which usually refer to waste emanating from a single, identifiable location; a non-point source usually refers to waste emanating from diffuse locations. Stormwater is considered to be a non-point source if stormwater is discharged as overland flow, not from an identifiable location such as a pipe.

Discharges from the SWPCP, NPWWF, and BWWF, including CSOs, are regulated under the individual waste discharge requirements (NPDES Permit set forth in Order No. R2-2008-0007 and NPDES No. CA0037664). Stormwater discharges regulated under the NPDES program are discussed in Section III.M. Sheet/overland flow is a non-point source not regulated under the NPDES program.

State

Operation of the SWPCP is subject to regulations set forth by the SWRCB and California Water Code.

Local

San Francisco General Plan

The Environmental Protection chapter and the Community Facilities chapter of the *San Francisco General Plan* contain the following policies relating to wastewater:

Environmental Protection

Objective 3 Maintain and improve the quality of the Bay, ocean and shoreline areas.

Policy 3.3 Implement plans to improve sewage treatment and halt pollution of the Bay and ocean.

Community Facilities

Objective 10 Locate wastewater facilities in a manner that will enhance the effective and efficient treatment of storm and wastewater.

Policy 10.1 Provide facilities for treatment of storm and wastewater prior to discharge into the Bay or ocean. Locate such facilities according to the Wastewater and Solid Waste Facilities Plan.

III.Q.7 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts related to wastewater, but generally consider that implementation of the Project would have significant impacts on these resources if it were to:

Q.c Require or result in the construction of new wastewater treatment or collection facilities or expansion of existing facilities, the construction of which could cause significant environmental effects

Q.d Result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments

Q.e Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board[1024]

Analytic Method

Water use and wastewater flows are related. In general, wastewater is generated from indoor water uses, such as flushing the toilet, bathing, or cooking uses. Historical benchmark water demand by land use and end use were calculated for the Project and are described in Table 6 of the Water Demand Memorandum prepared by Arup on October 15, 2009 (refer to Appendix Q2). Sanitary sewer flows were determined utilizing wastewater generation percentages based on land use and end use water demand (refer to Table 7 of Appendix Q2). These factors were then adjusted to account for conformance with Green Building Ordinance requirements. Project wastewater estimates, shown in Table III.Q-5 [Project Wastewater Generation], were made based on estimated water demand in Table 7 of Appendix Q2 and consistent with PUC-recommended methodology. Parks and open space wastewater generation (runoff) is not included in this table, as it would not be conveyed off site to the sewer system.

Table III.Q-5 Project Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed as % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total Project (mgd)*
Residential	95%	0.58	0.21	0.79
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.21	0.21
Hotel	57%	0.03	0	0.03
Football Stadium	95%	0	0.02	0.02
Performance Venue	95%	0.01	0	0.01
Total		***0.71***	***0.47***	***1.18***

SOURCE: Arup, October 15, 2009.

Wastewater impacts were determined by comparing the estimated future wastewater flows to the capacity of off-site conveyance lines and the wastewater treatment plants to determine whether sufficient capacity exists or whether there is the need for additional wastewater conveyance or treatment systems. As discussed in Section III.M, stormwater from Alice Griffith Public Housing site, Candlestick Park stadium, and portions of parking lots surrounding Candlestick Park stadium would no longer contribute stormwater flows to the Combined Sewer System, which would increase the available capacity in the Candlestick tunnel sewer and Hunters Point tunnel sewers.

[1024] This standard has been slightly modified from the text found in CEQA Guidelines, Appendix G, for ease of comprehension.

As noted, above, the Yosemite transport system and existing sewers have a storage volume of 11.5 million gallons. Although the current volume of stormwater flows from the Project site is not known, the increase in wastewater flows associated with development at Candlestick Point would likely be offset by the reductions in stormwater flows that would result from the installation of a separate stormwater collection and treatment system at Candlestick Point. However, for the purposes of this analysis, no credit is taken for the eliminated stormwater flows from the Candlestick Point site.

The Project would construct separate stormwater and wastewater systems. Thus, during wet weather, stormwater from the Project site would not enter the Combined Sewer System; the only Project flows that would enter the Combined Sewer System, during both dry and wet weather, would be wastewater. For the purposes of this analysis, dry-weather peak flows from the Project would be the same as wet-weather peak flows and there is no need to analyze stormwater flow volumes from the Project relative to conveyance capacity in this section (refer to Section III.M), for a full analysis of stormwater conveyance and treatment). Therefore, Project dry-weather peak flows are assumed to be the same as wet-weather flows.

Peak dry-weather flow capacities can be calculated by multiplying the average gallons-per-minute flow by a peaking factor. For purposes of this analysis, a conservative peaking factor of 3.0 was used, which yields a maximum flow capacity of 5,208 gpm for the Candlestick tunnel sewer and 12,501 gpm for the Hunters Point tunnel sewer. The capacity of conveyance systems is analyzed by comparing maximum peak flows to the design capacity of the trunk line, expressed in gallons per minute (gpm). Wastewater treatment capacity is analyzed by comparing the daily treatment capacity of the plant, expressed in million gallons per day (mgd), with the existing conditions plus Project wastewater generation. Table III.Q-6 (Sewer Trunk Capacity and Project Maximum Peak Flows) illustrates the design capacity of the two sewer trunk lines serving the Project site, the existing average flow, the calculated existing maximum peak flow, the Project's contribution to the off-site conveyance infrastructure, and the remaining capacity (with the Project) of each of the two trunk lines. The Candlestick tunnel sewer flows into the Hunters Point tunnel sewer, and the data below reflect those combined flow volumes. However, because only conveyance capacity in the Candlestick tunnel sewer would require analysis, those data are also provided. Candlestick Point development discharges to the Candlestick and Hunters Point tunnel sewer, while discharges from the HPS Phase II site flow into the Hunters Point tunnel sewer only.

Several planning studies, referenced in the introduction to this section, were prepared to identify the wastewater demand of the Project and the associated conveyance infrastructure necessary for the Project. This analysis relies on those estimates. As wastewater generation is a function of potable water demand, the baseline year for purposes of the wastewater analysis is 2009 to coincide with the date of the WSA that has been prepared for the Project.

Appendix Q1 describes two different methods to calculate wastewater generation: (1) percentage of water demand, and (2) by end use (e.g., toilets, laundry, process water, etc.). Utilizing the first method of calculating wastewater flows, the Project would generate a total of 1.18 mgd of wastewater; utilizing the second method, the Project would generate approximately 0.98 mgd. These calculations both assume full compliance with the Green Building Ordinance. The impact analysis that follows uses the more conservative estimate of 1.18 mgd of wastewater generated by the Project.

Table III.Q-6 Sewer Trunk Capacity and Project Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Project Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With Project*
Candlestick tunnel sewer	34,722	1,736	5,208	1,479	28,035[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	979	69,853[f]

SOURCE: Bayside Systems and Facilities Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes x 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that would be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project would be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that would be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project would be somewhat greater than 69,853 gpm.

As required by the Green Building Ordinance, high-rise and large buildings would be required to reduce water use by 30 percent in the year 2011 from a benchmark level adjusted for code. This requirement would result in a corresponding decrease in wastewater generation. Methods to achieve this standard could include, but are not limited to, low-flow plumbing fixtures, waterless urinals, and dual-flush toilets. Additional requirements for high-rise residential and large commercial buildings include water-efficient landscaping to reduce potable water use by 50 percent. Wastewater volume estimates take these Green Building Ordinance requirements into account. Peak dry-weather flow was calculated by multiplying the average gallons-per-minute flow by a peaking factor. For purposes of this analysis, a conservative peaking factor of 3.0 was used.

Construction Impacts

Significance Criterion Q.c, above, indicates that the Project would have a significant adverse effect if it would require or result in the construction of new wastewater treatment or collection facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of wastewater conveyance or treatment infrastructure associated with the Project.

Operational Impacts

Impact UT-3: Wastewater Conveyance and Treatment

The following discussion is organized to first address the adequacy of the wastewater conveyance system for Candlestick Point and HPS Phase II separately, followed by a discussion of the adequacy of the wastewater conveyance system and treatment facilities for the Project.

Wastewater Conveyance

Impact of Candlestick Point

Impact UT-3a **Implementation of the Project at Candlestick Point would not require expansion of existing off-site wastewater conveyance facilities. (Less than Significant with Mitigation) *[Criterion Q.d]***

Dry-Weather Conditions

Wastewater flows from the Candlestick Point site enter the Candlestick tunnel sewer, combining with flows from the Sunnydale Transport System, and enter the Yosemite Transport Facilities. The flows proceed through the Griffith Pump Station and then through the Hunters Point sewer tunnel, eventually combining with flows from the Islais Creek Transport System and entering the SWPCP. As indicated by Table III.Q-6, the Candlestick tunnel sewer has an average dry-weather flow of 2.5 mgd (1,736 gpm) and a design capacity of 50 mgd (34,722 gpm). The existing maximum dry-weather peak flow from the Candlestick Point site into the Candlestick tunnel sewer is 5,208 gpm (existing average daily flow times peaking factor). Projected maximum peak flows from the Candlestick Point portion of the Project, based on a peaking factor of 3.0, would be approximately 1,479 gpm, as indicated by Table III.Q-6. The remaining peak flow capacity of the Candlestick tunnel sewer with the Project would be 28,035 gpm (design capacity less existing peak flow less Project peak flow contribution). This number does not take credit for the existing uses that would be demolished with implementation of the Project and would no longer contribute wastewater and stormwater flows to the Candlestick tunnel sewer, which means that the actual remaining peak flow capacity of the Candlestick tunnel sewer would be somewhat greater than 28,035 gpm.

The Hunters Point tunnel sewer has an existing average dry-weather flow of 6 mgd (4,167 gpm) and a design capacity of 120 mgd (83,333 gpm).[1025] Existing maximum peak flow in the Hunters Point tunnel sewer is estimated at 12,501 gpm (average daily flow times peaking factor). Projected maximum peak flows from Candlestick Point into the Hunters Point tunnel sewer, based on a peaking factor of 3.0, would be approximately 979 gpm, as indicated by Table III.Q-6. The design capacity of the Hunters Point tunnel sewer is 83,333 gpm. With the development of Candlestick Point, the Hunters Point tunnel sewer would have a remaining capacity of 69,853 (83,333 gpm design capacity less 12,501 gpm existing peak flow gpm less 979 gpm from Candlestick Point development) during peak dry-weather flow conditions. Therefore, the addition of approximately 979 gpm peak flow from the Candlestick Point development would be accommodated within the remaining capacity of the Hunters Point tunnel sewer.

[1025] City and County of San Francisco, Public Utilities Commission, Bayside Systems and Facilities Operations Plan, 2002.

The contribution of 1,479 gpm from the Candlestick Point development represents only 5 percent (1,479 gpm/29,514 gpm available capacity) of the available design capacity of the Candlestick tunnel sewer and 2 percent (1,479 gpm/70,832 gpm available capacity) of the Hunters Point tunnel sewer. This is a small percentage that could be accommodated by the existing infrastructure. No expansion of the existing off-site conveyance infrastructure would be required to accommodate wet-weather flows with the Project's contribution. As the existing conveyance infrastructure could accommodate the additional flows from the Candlestick Point development in addition to existing flows even during periods of peak flow conditions, no expansion of the off-site wastewater conveyance lines would be required as a result of development at Candlestick Point. The impact would be less than significant, and no mitigation is required.

Wet-Weather Conditions

While Project development at Candlestick Point would no longer contribute stormwater to the Combined Sewer System, Project wastewater discharges during wet weather would combine with off-site wet-weather flows and contribute to overall wet-weather discharge volume in the system. If wet-weather volumes were to exceed the capacities of the available conveyance facilities, a CSO could occur.

The Technical Memorandum prepared by Hydroconsult Engineers (Appendix Q3) analyzed the potential impact of the Project on wet-weather flows and CSO events. Model results included the frequency, volume, and duration of CSO from the Yosemite Basin, the only basin that would be impacted by the proposed development, and the total CSO volume for the entire Bayside. Based on Project acreages, Hydroconsult calculated a baseline of 5.3 million gallons per year CSO for the Yosemite Basin (based on one event per year) and a total Bayside CSO of 890 million gallons per year. The analysis determined that future sanitary flows from Candlestick Point to the City's Combined Sewer System would increase slightly, by 0.518 mgd, due to the new development. However, the separate wastewater and stormwater systems would result in a *decrease* in CSO volume, frequency, and duration of CSO in the Yosemite Basin (3.1 million gallons per year compared to the baseline of 3.1 million gallons per year) and decrease in overall CSO volume for the entire Bayside Drainage Area from 890 million gallons per year to 877 million gallons per year because stormwater from the Project site would no longer flow into the Combined Sewer System. The proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows. Based on this analysis, the overall flows in the Bayside system during wet weather would be less than existing conditions with implementation of the Candlestick Point development. It is possible that a temporary increase in CSO volume could occur during wet weather if Project structures are occupied and contribute wastewater prior to completion of the Project's separate stormwater and wastewater infrastructure. To reduce this impact, the following mitigation measure shall be implemented:

MM UT-3a *Wet-Weather Wastewater Handling. Prior to approval of the Project's wastewater infrastructure construction documents for any new development, the Project Applicant shall demonstrate to the San Francisco Public Utilities Commission (SFPUC), in writing, that there will be no net increase in wastewater discharges during wet-weather conditions from within the Project Area boundary to the Bayside System compared to pre-Project discharges. This may be accomplished through a variety of means, including, but not limited to:*

- *Temporary on-site retention or detention of flows to the system*
- *Separation of all or a portion of the stormwater and wastewater system at Candlestick Point*

The contribution of the Candlestick Point development to the Bayside system represents a small percentage of its available capacity and would be accommodated by the existing infrastructure. Although development at Candlestick Point would increase wastewater flows (as intermittent flows from Candlestick Park stadium would be replaced by year-round flows from mixed-use development), the provision of separate stormwater and sewer systems would reduce overall wet-weather volumes to the Combined Sewer System. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact on the Combined Sewer System would be reduced to less than significant.

Impact of Hunters Point Shipyard Phase II

Impact UT-3b **Implementation of the Project at HPS Phase II would not require expansion of existing off-site wastewater conveyance facilities. (Less than Significant with Mitigation) *[Criterion Q.d]***

Dry-Weather Conditions

HPS Phase II is served by separate wastewater and stormwater systems, and existing wastewater flows from this area are minimal, as sewage lines are no longer in use within HPS Phase II. Thus, HPS Phase II does not currently contribute substantial wastewater to the Combined Sewer System. Based on meter data from January 2000 to August 2002, the HPS Phase II site generated an average of 0.154 mgd (106.9 gpm) of wastewater flow. Thus, the majority of the HPS Phase II does not currently contribute notable wastewater to the Combined Sewer System.

Based on estimated potable water use and the generation factors described, above, development at HPS Phase II would generate approximately 0.6 mgd of wastewater flows during operation. Wastewater generated at HPS Phase II would be transported via the new or expanded conveyance systems within the Project site and existing mains to the SWPCP.[1026] Wastewater from the HPS Phase II site flows into the Hunters Point tunnel sewer. The Hunters Point tunnel sewer has an existing average dry-weather flow of 6 mgd (4,167 gpm) and a design capacity of 120 mgd (83,333 gpm).[1027] Existing maximum peak flow in the Hunters Point tunnel sewer is estimated at 12,501 gpm (average daily flow times peaking factor). Projected maximum peak flows from HPS Phase II into the Hunters Point tunnel sewer, based on a peaking factor of 3.0, would be approximately 979 gpm (0.47 mgd/24 hours/60 minutes x 1,000,000 times 3.0). The design capacity of the Hunters Point tunnel sewer is 83,333 gpm. With the Project, the Hunters Point tunnel sewer would have a remaining capacity of 69,853 gpm during peak dry-weather flow conditions. Therefore, the addition of approximately 979 gpm peak flow from the HPS Phase II development would be accommodated within the remaining capacity of the Hunters Point tunnel sewer.

[1026] *Candlestick Point/ Hunters Point Shipyard Infrastructure Concept Report* (June 30, 2009, revised July 22, 2009) prepared by Winzler & Kelly Consulting Engineers.

[1027] City and County of San Francisco, Public Utilities Commission, Bayside Systems and Facilities Operations Plan, 2002.

The contribution of 979 gpm from the HPS Phase II development represents only 1.2 percent of the total design capacity of the tunnel. This is a negligible percentage, and flows from the HPS Phase II site would be accommodated by the existing infrastructure. No expansion of the existing off-site conveyance infrastructure would be required to accommodate dry-weather flows with the contribution from development at HPS Phase II. As the existing conveyance infrastructure could accommodate the additional flows from the HPS Phase II development in addition to existing flows even during periods of peak flow conditions, no expansion of the off-site wastewater conveyance lines would be required as a result of HPS Phase II. The impact would be less than significant and no mitigation is required.

Wet-Weather Conditions

While Project development at HPS Phase would not contribute stormwater to the Combined Sewer System, Project wastewater discharges during wet weather would combine with off-site wet-weather flows and contribute to overall wet-weather discharge volume in the system. If wet-weather volumes were to exceed the capacities of the available conveyance facilities, a CSO could occur.

The Technical Memorandum prepared by Hydroconsult Engineers (Appendix Q3) analyzed the potential impact of the Project on wet-weather flows and CSO events. Hydroconsult determined that future sanitary flows from the HPS Phase II development to the City's Combined Sewer System would increase slightly by 0.236 mgd. However, the results of hydrologic modeling assuming the proposed separate wastewater and stormwater systems indicate a *decrease* in CSO volume, frequency, and duration of CSO in the Yosemite Basin and a decrease in overall CSO volume for the entire Bayside Drainage Area because stormwater from the Project site would no longer flow into the Combined Sewer System. The proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows. In addition, mitigation measure MM UT-3a would ensure that there would be no increase in CSO flows as a result of the Project by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. The impact on the Combined Sewer System would be reduced to less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact UT-3 **Implementation of the Project would not require expansion of existing off-site wastewater conveyance or treatment facilities. (Less than Significant with Mitigation) *[Criterion Q.d]***

Wastewater Conveyance

Dry-Weather Conditions

The Candlestick Point development would discharge a maximum peak flow of 1,479 gpm to the Candlestick tunnel sewer, which has an existing unused capacity of 28,035 gpm in dry weather. This flow would combine with a maximum peak flow of 979 gpm from the HPS Phase II into the Hunters Point tunnel sewer. The total maximum peak Project flows of 2,458 gpm would combine in the Hunters Point tunnel sewer, which has an existing unused capacity of 69,853 gpm in dry weather. This represents 3.5 percent of the available capacity of the Hunters Point tunnel sewer, which could be accommodated by the existing off-site infrastructure.

Wet-Weather Conditions

Hydroconsult Engineers determined that the total net increase in wastewater from the Project site would equal 0.754 mgd, and that there would be a decrease in CSO volume, frequency, and duration of CSO in the Yosemite Basin and a decrease in overall CSO volume for the entire Bayside Drainage Area because stormwater from the Project site would no longer flow into the Combined Sewer System. The proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows. Based on this analysis, the overall volumes in the Bayside system during wet weather would be less than under existing conditions with implementation of the Project. It is possible that a temporary increase in CSO volume could occur during wet weather if Project structures are occupied and contribute wastewater to the Combined Sewer System prior to completion of the Project's separate stormwater and wastewater infrastructure. Mitigation measure MM UT-3a would ensure that there would be no increase in CSO flows as a result of the Project by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. The impact on the Combined Sewer System would be reduced to less than significant.

Wastewater Treatment

Based on estimated potable water use and utilizing the percentage factors as described in Table III.Q-5, development at Candlestick Point would generate approximately 0.71 mgd of wastewater. Development of HPS Phase II would generate approximately 0.47 mgd of wastewater. The SWPCP currently treats approximately 67 mgd during dry-weather conditions and has a capacity to treat 150 mgd to the secondary treatment standard. The net increase in dry-weather wastewater flows with the Project would represent only 1.4 percent of the remaining dry-weather treatment capacity (1.18 mgd/83 mgd) and 0.8 percent of the overall treatment capacity of the SWPCP (1.18 mgd/150 mgd).

The current remaining treatment capacity of the SWPCP would accommodate the increase in wastewater flows from the Project development. As noted, overall flows during wet weather would decrease, indicating that the proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows, assuming completion of Project utility infrastructure prior to Project occupancy. Based on this analysis, the overall volumes in the Bayside system during wet weather would be less than under existing conditions with implementation of the Project. It is possible that a temporary increase in CSO volume could occur (which could affect the capacity of the SWPCP for treatment) during wet weather, as noted, above. Mitigation measure MM UT-3a would reduce this impact to less than significant by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. Thus, the Project would not result in any net increase in CSO volume in the Bayside system during wet weather. A less-than-significant impact to existing off-site treatment facilities would occur.

Impact UT-4: Wastewater Treatment Requirements of the RWQCB

Impact UT-4 **Implementation of the Project would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board. (Less than Significant) *[Criterion Q.e]***

As discussed in Impact UT-3 above, the Project development would incrementally contribute wastewater during dry and wet-weather events to the Combined Sewer System operated by the SFPUC, but overall, wet-weather volumes would decrease in the Bayside system with construction of the Project's separate stormwater and wastewater systems. The SWPCP, the NPWWF, and the BWWF are required to comply with the WDRs set by the RWQCB, which specify the discharge requirements for those facilities.

As discussed in the Regulatory Framework above, the NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the Project would be treated at the SWPCP wastewater treatment plant and BWWF. The SFPUC, which operates the SWPCP wastewater treatment plant and BWWF, is required to comply with permit requirements set by the RWQCB, which specify the discharge requirements for the facility. These extensive requirements are codified in Order No. R2-2008-0007 for NPDES Permit No. CA0037664 and prohibit, among other things, exceedance of dry-weather flow of 84.5 mgd and discharge of any untreated wastewater to any waters of the United States, including the Bay. Compliance with any applicable permit requirements, as monitored and enforced by the SFPUC, would ensure that the Project would not exceed the applicable wastewater treatment requirements of the RWQCB. In addition, the Project would not cause the City to exceed the requirements of the NPDES permit for the reasons previously stated and because the flows during wet weather would actually decline compared to existing flows from the Project site. This impact would be less than significant. No mitigation is required.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts to wastewater treatment and conveyance facilities is the wasteshed that utilizes the Candlestick Point and Hunters Point tunnel sewers and contributes wastewater to the SWPCP and potentially the NPWWF and BWWF during wet weather. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. For wastewater conveyance, reasonably foreseeable development includes future projects that would be served by the Bayside Transport/Storage System, as described in Section III.Q.5 of this section. For wastewater treatment, the cumulative projects would include all reasonably foreseeable future development in the Bayside Drainage Area that would utilize the SWPCP, NPWWDF, and BWWF.

Wastewater Conveyance Capacity

Cumulative projects in the Bayside Drainage Area would contribute both additional wastewater and additional stormwater to the Bayside System, which could exceed its capacity. As noted above, the Bayside Systems and Facilities Operations Plan is intended to implement strategies to meet the objectives expressed in the Plan, which include maximizing the volume of wastewater treated at the SWPCP or NPWWF consistent with their capacities. Any cumulative projects that would result in wastewater and/or stormwater

flows that exceed the capacity of the Bayside system would be inconsistent with the objectives of the Operations Plan and would result in a potentially significant impact on wastewater conveyance.

The Project would construct a separate stormwater and wastewater system on site and would only contribute wastewater to the Bayside System. Peak-flow capacities of the Bayside System are adequate to convey the wastewater generated by the Project, which would only represent 3.5 percent of the remaining available capacity of the Bayside conveyance system. Wet-weather flow volumes would be reduced compared to existing conditions because the stormwater that currently flows from the Project site into the combined system would be offset by the proposed separated stormwater and wastewater system on site. Because there would be adequate dry-weather conveyance capacity to transport wastewater from the Project and because the total wet-weather volume in the Bayside system with the Project would be less than under current conditions, it would have no impact and, regardless of future contributions to CSOs from other projects, the Project's contribution would not be cumulatively considerable. Mitigation measure MM UT-3a would ensure that there would be no increase in CSO flows as a result of the Project by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. The Project's cumulative impact would be less than significant.

Wastewater Treatment Capacity

Wastewater from the Project site is treated at the SWPCP. The SWPCP has a design capacity of 150 mgd to secondary treatment standards, with the ability to treat an additional 100 mgd during wet weather to primary treatment standards. The SWPCP currently processes an average flow of 67 mgd, with a remaining secondary treatment capacity of 83 mgd. Cumulative projects in the wastershed would contribute to the overall demand for wastewater treatment by the SWPCP.

The SWPCP can accommodate the maximum additional 1.18 mgd of wastewater generated by the Project without requiring any expansion of existing facilities. Development of cumulative projects within the wasteshed, including the Project, is not expected to generate additional quantities of wastewater beyond the current capacity of the SWPCP. The existing and future wastewater flows in combination with Project flows would not exceed the capacity of existing infrastructure and would not require or result in the construction of new or expanded wastewater conveyance facilities or expansion of existing facilities, other than those on site, for which construction impacts have been comprehensively analyzed in this EIR. Therefore, the Project's cumulative impact would be less than significant.

Compliance with Waste Discharge Requirements

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City of San Francisco be subject to specific discharge requirements. The Project would not result in the discharge of untreated wastewater to any surface waters. Operational discharges would be sent through the Project's on-site sewer system that connects to the City's Combined Sewer System. Wastewater generated at the Project site would ultimately be treated at the SWPCP. The SWPCP is required to comply with its associated waste discharge requirements, which set the levels of pollutants allowable in water discharged from any facility. Related projects would be required to follow all local and regional rules and regulations pertaining to wastewater treatment compliance. Consequently, there would be no cumulative problem to which the Project could contribute. The Project's cumulative impact would be less than significant with regard to compliance with waste discharge requirements.

Solid Waste[1028]

III.Q.8 Setting

Collection, Transfer, and Disposal

Municipal solid waste collection, recycling, and disposal within the City is managed by SF Recycling Incorporated, a private company and subsidiary of Norcal Waste Systems, Incorporated. Residential and commercial solid waste generated at the Project site is collected by Sunset Scavenger Company, which delivers it to the SF Recycling Center. There, the solid waste stream is sorted to remove recyclables and organic materials. Organic waste is sent to the Jepson Prairie composing facility, which has the capacity to process approximately 300 tons per day, or approximately 5,200 tons of food waste (food scraps) from commercial premises and 2,000 tons of green waste per month.

Municipal solid waste remaining after sorting is currently transported to the Altamont Landfill in Livermore. Altamont Landfill serves a number of jurisdictions, including several East Bay cities such as Oakland, Alameda, Emeryville, and Richmond; however, San Francisco is the largest single contributor to the landfill. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste at Altamont. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1029]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has identified three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs.

In 2007, the volume of waste contributed by San Francisco represented approximately 41 percent of the total waste interred at this facility. The landfill's total capacity is 62 million cubic yards, of which 73.7 percent (45.7 million cubic yards) is remaining as of August 2009.[10301031] According to the California Integrated Waste Management Board (CIWMB) Solid Waste Information (SWIS) database, the landfill would reach capacity in January 2032 if disposal continues at current rates; however, the Altamont Landfill is currently scheduled for closure on January 1, 2029.[1032]

[1028] Hazardous wastes are discussed in Section III.K (Hazards and Hazardous Materials).
[1029] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.
[1030] California Integrated Waste Management Board, 2009. *Active Landfill Profile for Altamont Landfill & Resource Recovery (01-AA-0009).* Available online at: <http://www.ciwmb.ca.gov/Profiles/Facility/Landfill/LFProfile1.asp?COID=1&FACID= 01-AA-0009> (accessed August 24, 2009).
[1031] Landfill capacity is measured in cubic yards, since landfill capacity is more a function of volume than weight. Densities of constituents of municipal solid waste vary, while municipal solid waste is tracked in tons. For purposes of this analysis, known densities of materials types are utilized to calculate the amount of solid waste that the City contributes to the Altamont Landfill in cubic yards.
[1032]. Phone communication with David Assman, City of San Francisco, Department of the Environment. August 11, 2009.

Hazardous Waste Disposal

Refer to Section III.K for a full discussion of the regulatory framework for the handling, transport, and disposal of hazardous materials in California. Section III.K also analyzes safety risks as a result of handling, transport, or disposal of hazardous materials. This section focuses on hazardous waste disposal capacity.

Hazardous waste in the Bay Area is treated by registered Treatment, Storage, and Disposal facilities (TSDs). Several counties in the Bay Area have TSDs. For example, Alameda County has considerable hazardous waste treatment capacity (99,280 tons), between Evergreen Oil in Newark and AERC of Hayward. Marin County has one TSD, Photo Waste Recycling. San Mateo County has one large TSD. Santa Clara County has six TSDs. The City and County of San Francisco have no TSDs. In 2006, no San Francisco hazardous waste generators exported over 1,000 tons of hazardous wastes.[1033] However, in 2007, 44,222 tons of inorganic solid wastes (likely lead-contaminated building materials and soil) were removed from the Presidio, a former military base. The hazardous wastes generated in San Francisco in 2007 totaled 50,214 tons, an unusually large number because of the activities at the Presidio.

There is no State agency that establishes a ceiling on the amount that a hazardous waste treatment facility can process in a year, although some treatment facilities are regulated by Air Quality Management District Permits, which may limit capacity. All regional TSDs have capacity that exceeds the actual amounts of wastes that they treat.[1034] However, it should be noted that the treatment processes locally available do not match the treatment processes needed (these processes may include combustion or incineration, which is used to destroy hazardous organic constituents and reduce the volume of waste, disposal of liquid hazardous waste in underground injection wells) in the region. Therefore, many tons of hazardous waste are treated either elsewhere in California or other states. The Bay Area Hazardous Waste Management Facility Allocation Committee has determined that the prohibitive costs of siting a new hazardous waste treatment facility make it unlikely that a new facility would open in the Bay Area, but notes that Evergreen Oil has recently expanded its recycling capacity.

In 2007, waste generators in the nine counties of the Bay Area transported 568,156 tons of hazardous waste for off-site treatment. Of this amount, 305,594 tons (slightly over half) were "industrial wastes." The remainder included one-time wastes such as asbestos or contaminated soils, or may have been double-counted. The most common wastes generated in 2007 from the Bay Area included inorganic solids (such as lead paint waste or refining wastes), waste oil, and waste solvents. Of the 305,594 tons, roughly 17 percent (51,650 tons) was treated in the Bay Area, 79 percent was treated in California, and the remainder went to Utah and Nevada.

For household hazardous waste, SF Recycling & Disposal, Inc. operates a permanent facility for residents to safely dispose of the hazardous waste generated from their homes. The most common wastes received are leftover paint, motor oil from cars, thinners, spray cans, and old garden products, such as pesticides and fertilizers. SF Recycling & Disposal also operates the Artist-In-Residence Program, which uses art to

[1033] Bay Area Hazardous Waste Management Facility Allocation Committee, *Hazardous Waste Generation and Treatment Trends, San Francisco Bay Area, 2006 and 2007 Manifest Data*, May 2009.
[1034] Bay Area Hazardous Waste Management Facility Allocation Committee, *Hazardous Waste Generation and Treatment Trends, San Francisco Bay Area, 2006 and 2007 Manifest Data*, May 2009.

inspire people to recycle more and conserve natural resources. The company provides selected local artists with the opportunity to create art using materials they gather from San Francisco's refuse.

Construction Waste

Under the City and County of San Francisco's Construction and Demolition (C&D) Ordinance, effective July 1, 2006, at least 65 percent of C&D debris (such as wood, metal, concrete, asphalt, and sheetrock) taken from a site must go to a registered construction recycling facility and cannot go to a landfill. This mandatory ordinance maximizes the recycling of mixed construction and demolition debris and applies to all commercial and residential indoor and outdoor construction projects, including repairs, improvements, additions, remodeling, and demolitions. The ordinance also requires that all mixed C&D debris, transported off site, must be hauled by a registered transporter, and be taken to a registered facility that can process mixed C&D debris, thereby diverting a minimum of 65 percent of the material from landfill. SF Recycling & Disposal operates a registered facility specifically designed to recycle construction debris. Similarly, Section 1304C.1.3.4 of the City's Green Building Ordinance, which was effective January 1, 2009, requires documentation to ensure that at least 75 percent of a Project's construction debris is diverted).

Recycling and Diversion

Waste Generation and Diversion Trends

According to the CIWMB, San Francisco households generate approximately one pound of solid waste per resident per day, while commercial uses generate approximately 4.7 pounds per employee per day.[1035] In 2008, the City produced approximately 594,732 tons of solid waste altogether.[1036]

Approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1037] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1038] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes. The City has prepared a number of strategies, discussed below, to divert additional solid waste and achieve citywide diversion goals.

Zero Waste Strategies

The City plans to achieve a 75 percent landfill diversion by 2010 and full (100 percent) waste diversion by 2020 (refer to Regulatory Framework, below). The City encourages residents and businesses to pre-sort recyclables, compostable wastes (food scraps and yard waste), and garbage into separate curbside collection

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[1035] California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Accessed online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco> (accessed November 5, 2008).

[1036] http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile2.asp?RG=C&JURID=438&JUR=San+Francisco (accessed October 18, 2009).

[1037] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Accessed online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID=438&JUR=San +Francisco> (accessed November 5, 2008).

[1038] City of San Francisco, *Waste Characterization Study: Final Report.* 2008.

containers; sponsors regular public outreach events to educate San Francisco residents and businesses about waste diversion techniques; and conducts special collection events for wastes that are not generally recyclable at curbside (e.g., batteries, electronics, hazardous wastes). For municipal operations, City departments participate in a sustainable purchasing program that encourages the purchase of recyclable materials. The City also sponsors grants for waste-diversion research and works with businesses to create market opportunities for materials reuse and recapture. Local waste management providers have upgraded sorting and transfer facilities to maximize the volume of material diverted. On June 9, 2009, the City Board of Supervisors approved an ordinance that would make recycling and composting mandatory for residential and commercial uses. These and similar strategies would be utilized to achieve the City's overall waste reduction goals.

Existing Project Site Solid Waste Generation

Based on CIWMB solid waste generation factors, residential and commercial uses at Candlestick Point currently generate approximately 1,469 tons of solid waste annually.[1039] Events at Candlestick Park stadium generate approximately 74 tons of solid waste per event[1040] for a total estimated generation of approximately 1,038 tons annually (assuming fourteen sold-out events per year). The existing Hunters Point Shipyard artists' studios generate approximately 274 tons of operational solid waste annually.[1041] Current total solid waste generation from the Project site is approximately 2,781 tons annually, approximately 0.4 percent of the City's annual solid waste generation of approximately 594,732 tons per year in 2008.

III.Q.9 Regulatory Framework

Federal

With the exception of determining where disposal sites are located and operational standards, there are no applicable federal laws, regulations, or policies that pertain to solid waste.

State

At the state level, the management of solid waste is governed by regulations established by the CIWMB, which delegates local permitting, enforcement, and inspection responsibilities to local enforcement agencies. In 1997, some of the regulations adopted by the SWQCB pertaining to landfills (Title 23, Chapter 15) were incorporated with CIWMB regulations (Title 14) to form Title 27 of the California Code of Regulations (CCR).

[1039] The square footage of existing uses is not known; therefore, per employee generation factor is used. Calculated according to the following formula using solid waste generation factors from CIWMB, 2008: [1,113 residents (5 lbs/day) + 529 employees (4.7 lbs/day)] (365 days/year) divided by 2000 lbs/ton.

[1040] Calculated according to a waste generation factor of 2.23 pounds per seat, adjusted for a 5 percent "no show" factor (95 percent of 70,000 seats), then divided by 2000 lbs per ton and multiplied by 14 annual events, as described in Table III.Q-8 (Project Solid Waste Generation).

[1041] Calculated according to the following formula using waste generation factors from CIWMB, 2008: [300 persons (5 lbs/day)(365 days/year)] divided by (2000 lbs/ton).

California Integrated Waste Management Act

In 1989, the Legislature adopted the *California Integrated Waste Management Act of 1989*, which established an integrated waste management hierarchy that consists of the following approaches in order of importance: (1) source reduction, (2) recycling and composting, and (3) environmentally safe transformation and land disposal. The law also required that each county prepare a new Integrated Waste Management Plan. The Act further required each city to prepare a Source Reduction and Recycling Element (SRRE) by July 1, 1991. Each SRRE includes a plan for achieving a solid waste goal of 25 percent by January 1, 1995, and 50 percent by January 1, 2000 (based on a 1989 baseline). A number of changes to the municipal solid waste diversion requirements under the Integrated Waste Management Act were adopted, including a revision to the statutory requirement for 50 percent diversion of solid waste. Under these provisions, local governments were required to divert at least 50 percent of all solid waste on and after January 1, 2000. Some progress has been made. Under Project Recycle, the number of state facility recycling programs has increased from 150 in 1991 to more than 1,800 today; and the amount of material recycled during this period has expanded from 2,000 tons a year to more than 63,000 tons a year. Nevertheless, the overall level of performance trails far behind the percentages of local jurisdictions striving to meet the requirements of the Act. To address this need, 1999 legislation established state agency diversion mandates of 25 percent in 2002 and 50 percent in 2004, requiring each agency to also adopt an integrated plan to achieve the mandates. The CIWMB is now assisting agencies in developing their plans. The CIWMB is the driving force behind the state's Green Building Task Force, whose goal is to institutionalize sustainable building practices as part of state construction projects in an efficient, practical, and cost-effective manner.[1042]

Local

San Francisco Board of Supervisors Resolution Number 679-02

Resolution 679-02, adopted by the San Francisco Board of Supervisors in September 2002, adopted a citywide landfill diversion goal of 75 percent by the year 2010 and a long-term zero waste (100 percent diversion) goal. The San Francisco Department of the Environment passed Resolution 002-03-COE in March 2003, setting a target date of 2020 for achieving zero waste.

Construction and Demolition Debris Recovery Ordinance

Projects that require demolition of an existing structure must submit a waste-diversion plan to the Director of the San Francisco Department of the Environment as required by the City's Construction and Demolition Debris Recovery Ordinance (Ordinance 27-06, Chapter 14, *San Francisco Environment Code*). The waste-diversion plan must demonstrate that 65 percent or more of the total construction and demolition debris produced as the result of the Project (such as wood, metal, concrete, asphalt, and sheetrock) is diverted from landfill interment.

Green Building Ordinance

On August 5, 2008, the City adopted the *San Francisco Building Code* (SFBC), Chapter 13C, "green building codes" for new construction and for renovations of existing structures, consistent with the GHG reduction

[1042] http://www.calepa.ca.gov/about/history01/ciwmb.htm. Accessed September 30, 2009.

measures in the SFCAP. The new green building standards in SFBC Chapter 13C are to be phased in by 2012. At 2012, the ordinance specifically requires newly constructed commercial buildings over 5,000 square feet (sf), residential buildings over 75 feet in height, and renovations on buildings over 25,000 sf, to be subject to LEED® Gold (or an equivalent standard), which makes San Francisco the city with the most stringent green building requirements in the nation. The ordinance identifies cumulative benefits through the year 2012 which include reducing construction and demolition waste by 700 million pounds and increasing the valuations of recycled materials by $200 million.

New projects would be evaluated on a point system, with credit given for materials used in the building, the location of the building site, and water and energy efficiencies. The new codes focus on water and energy conservation, recycling, and reduction of carbon emissions. They apply to most buildings in the City, including residential projects of all sizes, new commercial buildings, and renovations of large commercial spaces. Large residential and commercial buildings would be evaluated under the Leadership in Energy and Environmental Design (LEED)® or GreenPoint Rated green building certification rating system. Medium and small residential construction would use the GreenPoint rating system, which is less stringent.

Mandatory Recycling and Composting Ordinance

In June 2009, the San Francisco Board of Supervisors passed Ordinance 100-09, a universal recycling and composting ordinance that requires all residences and commercial businesses in San Francisco to separate their refuse into dedicated bins for recyclables, compostables, and trash. This ordinance adds Chapter 19, Sections 1901 through 1912, and is entitled Mandatory Recycling and Composting Ordinance, amending the *San Francisco Public Works Code* by amending Sections 291, 291.1, 291.2, 291.4, 291.7, 291.11, 291.12, 291.15, 291.17, and 293.1, and by repealing current Sections 291.9 and 291.16 and adding a new Section 291.16, providing enforcement mechanisms and penalties for violations. According to the ordinance, recyclables, compostables, and trash may not be mixed in a single bin or placed in a bin designated for another form of refuse. Building owners or managers are required to maintain appropriate, color-coded, labeled containers in convenient locations, and educate tenants, employees, and contractors, including janitors, on how to separate materials. Failure to comply with these policies would result in fines; however, fines would not be assessed until 2011, allowing for gradual implementation of the new program.

Waste Disposal Agreement, Altamont Landfill and Resource Recovery Facility

The City has an agreement with the Altamont Landfill, the primary landfill serving the City, to match or exceed the waste-diversion thresholds required in Alameda County. The Alameda County Integrated Waste Management Plan (Goal 2, Objective 2.1) has a diversion goal of 75 percent of the solid waste generated within its municipalities by 2010.

San Francisco General Plan

The *San Francisco General Plan* contains the following policies within the Community Facilities chapter relating to solid waste:

Objective 10 Locate solid waste facilities in a manner that will enhance the effective and efficient treatment of solid waste.

III.Q.10 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts associated with solid waste, but generally consider that implementation of the Project would have significant impacts on these resources if it were to:

Q.f Be served by a landfill with insufficient permitted capacity to accommodate Project-related solid waste disposal needs

Q.g Fail to comply with federal, state, and local statutes and regulations related to solid waste

Analytic Method

To determine the amount of solid waste generated by the Project, solid waste generation factors identified by the CIWMB are applied to the Project's land uses. Construction-related solid waste results from demolition of existing structures and infrastructure (including asphalt and concrete) and waste from excess building materials. To determine solid waste impacts associated with implementation of the Project, estimated future solid waste generation amounts are compared to the total anticipated remaining capacity at the Altamont Landfill to determine whether adequate capacity exists. The baseline year for purposes of the solid waste analysis is 2009, which is when data for the Altamont Landfill were collected from the CIWMB. The Project is further analyzed for its compliance with statutes and regulations related to solid waste.

Construction Impacts

Impact UT-5: Construction Solid Waste and Permitted Landfill Capacity

Up to 37,500 tons of solid waste would be produced during construction of new buildings and infrastructure. As shown in Table III.Q-7 (Estimated Demolition Debris), it is estimated that approximately 876,195 tons of construction waste would be produced during building demolition and 95,590 tons of construction waste would be produced during road demolition (these data include off-site infrastructure improvement debris). A total of 971,785 tons of construction waste would be produced during building and road demolition over the Project build-out period.

Impact of Candlestick Point

Impact UT-5a **Construction at Candlestick Point, including demolition of existing facilities, would not generate construction-related solid waste that would exceed the capacity of landfills serving the City and County of San Francisco. (Less than Significant with Mitigation) *[Criterion Q.f]***

- It is anticipated that the Project would be constructed in phases beginning in 2011, with full build-out by 2031, which represents an approximately 20-year construction period; however, as indicated by Figure II-16 (Proposed Site Preparation Schedule), all demolition activities would be concluded by 2028 in Candlestick Point.

Construction debris would be generated by the demolition and removal of existing structures and utility infrastructure at Candlestick Point and the construction of new residential and commercial space and associated infrastructure. Construction of the Candlestick Point development would generate approximately 424,681 tons of mixed construction debris over the construction period, or approximately 44 percent of total Project C&D debris.

Table III.Q-7 Estimated Demolition Debris

	Concrete/Asphalt[a] (tons)	*Wood[b] (tons)*	*Steel[c] (tons)*	*Misc. Debris[d,e] (tons)*	*Total[f] (tons)*
Candlestick Point					
Building Demolition	212,361	26,611	104,250	55,150	398,372
Road Demolition	2,021	0	33	24,255	26,309
Subtotal	*214,382*	*26,611*	*104,283*	*79,405*	*424,681*
Hunters Point Shipyard Phase II					
Building Demolition	179,652	137,572	74,480	86,119	477,823
Road Demolition	36,950	0	0	32,331	69,281
Subtotal	*216,602*	*137,572*	*74,480*	*118,450*	*547,104*
Total	***430,984***	***164,183***	***178,763***	***197,855***	***971,785***

SOURCE: Lennar Urban, 2009.

a. Concrete/asphalt debris can be sized and recycled on site as pipe bedding or road base.
b. Wood debris can be chipped and sent to the local landfill for disposal.
c. Scrap steel can be recycled off site.
d. Miscellaneous debris including glass, asphalt, plastic, etc would be transported and disposed of at a local landfill.
e. Asphalt included in Miscellaneous Debris may be recycled.
f. Quantity estimates are approximate. Pre-demolition surveys need to be performed to confirm size of structures and building material types.

Sustainable construction practices are an important part of the Project's overall waste management strategy. The Project Applicant has balanced cut and fill on the site to the maximum extent feasible to minimize the need to dispose of excavation materials off site. The use of imported topsoil would be minimized by utilization of green waste and site-based soils to create topsoil. Modern methods of construction and off-site manufacturing would be used to eliminate waste. The Project would also implement a system for the production of secondary aggregate from inert C&D waste in a manner that conforms to the requirements of local standards and processors of inert C&D waste.

In order to reduce the amount of construction waste generated by the Project and diverted in landfills, a Waste Diversion Plan shall be prepared. The Waste Diversion Plan would include a process to measure the types and quantities of waste produced and include requirements for regular monitoring of performance against waste reduction and recovery targets by the Project Applicant or an appointed site waste management contractor. Each of these strategies, and/or other suitable strategies, would be implemented through mitigation measure MM UT-5a, which requires that 75 percent of construction waste is diverted from landfill(s):

MM UT-5a *<u>Construction Waste Diversion Plan.</u> The Project Applicant shall submit a Construction Waste Diversion Plan to the Director of the San Francisco Department of the Environment demonstrating a plan to divert at least 75 percent of or more of the total construction and demolition debris produced as*

the result of the Project (such as wood, metal, concrete, asphalt, and sheetrock) from landfill interment, which is required by the City's Green Building Ordinance. The Plan shall be submitted and approved by the Director of the San Francisco Department of the Environment before the issuance of building permits. This Plan shall include (1) identification of how much material resulting from demolition of existing facilities could be reused on site (e.g., existing asphalt and concrete could be removed, crushed, reconditioned, and reused as base material for new roadways and parking lots); (2) the extent to which materials could be sorted on site (e.g., through piecemeal demolition of selected facilities to extract recyclable materials), (3) the amount of material that would be transported to an off-site location for separation; and (4) the amount of materials that cannot be reused or recycled and would be interred at a landfill, such as the Altamont Landfill in Livermore.

Some construction and demolition debris would be reused on site (e.g., existing asphalt in parking areas would be removed, crushed, reconditioned, and reused as base material for new roadways and parking lots), while other materials would be transported off site for separation. SF Recycling & Disposal operates a registered facility specifically designed to recycle construction debris from the City. Even if no construction and demolition debris were to be reused on site, diverting 75 percent of construction solid waste pursuant to mitigation measure MM UT-5a would mean that approximately 318,511 tons of construction waste would be transported to SF Recycling & Disposal or other facilities, if needed, available to recycle construction debris. Approximately 106,170 tons of construction debris (over the entire construction period) that cannot be recycled would be transported to the Altamont Landfill. The remaining capacity of the Altamont Landfill as of August 2009 is 45.7 million cubic yards. At an average density of 1 ton per cubic yard,[1043] 106,170 tons would equal 106,170 cubic yards. The contribution from construction of the Candlestick Point development would represent 0.2 percent of the available remaining capacity.

At current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, its permit expires three years earlier, in January 2029.[1044] Demolition activities, which generate construction debris, are expected to conclude in 2028 at Candlestick Point, one year before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste, as also required by mitigation measure MM UT-5a, which would reduce the amount of waste interred at the landfill. In total, the construction waste sent to Altamont Landfill from activities at Candlestick Point would represent only 0.2 percent of the landfill's remaining capacity. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Project on solid waste would be further reduced. The impact of construction waste generated by development of Candlestick Point on the capacity of the Altamont Landfill would be less than significant.

[1043] Densities of construction waste vary from between 400 pounds/cubic yard for wood material to 2400 pounds/cubic yard for loose asphalt and concrete Available online at:
<http://www.ciwmb.ca.gov/LEAtraining/Resources/CDI/Tools/Calculations.htm>, Accessed: August 24, 2009.
[1044] CIWMB, 2009.

Impact of Hunters Point Shipyard Phase II

Impact UT-5b **Construction at HPS Phase II, including demolition of existing facilities, would not generate construction-related solid waste that would exceed the capacity of landfills serving the City and County of San Francisco. (Less than Significant with Mitigation) *[Criterion Q.f]***

At HPS Phase II, new development would begin with the construction of the 49ers stadium, scheduled for completion during the 2014–2017, or alternately by 2022, time period.[1045] Demolition activities at the rest of HPS Phase II would begin in 2011 and conclude by 2028, as indicated by Figure II-16.

Construction debris would be generated by the demolition and removal of existing structures and utility infrastructure within the HPS Phase II site and the construction of new structures and infrastructure. The HPS Phase II component of the Project is estimated to generate approximately 547,104 tons of total construction debris, which represents approximately 56 percent of the total C&D debris that would be generated by the Project. Some construction and demolition debris would be reused on site (e.g., existing asphalt in parking areas would be removed, crushed, reconditioned, and reused as base material for new roadways and parking lots), while other materials would be transported off site for separation. Materials that cannot be reused or recycled are anticipated to be transported to the Altamont Landfill. At a 75 percent diversion rate, approximately 136,776 tons would be transported to the landfill.

The remaining capacity of the Altamont Landfill as of August 2009 is 45.7 million cubic yards. The estimated 136,776 tons of construction waste is equivalent to approximately 136,776 cubic yards at an average density of 1 ton per cubic yard.[1046] This represents approximately 0.3 percent of the available remaining capacity in the Altamont Landfill.

As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1047] Most of the demolition activities, which generate construction debris, are expected to conclude in 2028 at HPS Phase II, six years before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste, as also required by mitigation measure MM UT-5a, which will reduce the amount of waste interred at the landfill. In total, the construction waste sent to Altamont Landfill from activities at HPS Phase II would represent only 0.3 percent of the landfill's remaining capacity. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Project on solid waste would be further reduced. The impact of the construction waste generated by HPS Phase II development on the capacity of the Altamont Landfill would be less than significant.

[1045] The 49ers have two five-year lease extension options. If exercised, they could remain in the stadium through May 2018 or May 2023. In order to have a seamless transition from the existing stadium to a new stadium at HPS Phase II, the new stadium should be constructed before their lease expires, by either 2017 or 2022.

[1046] Densities of construction waste vary from between 400 pounds/cubic yard for wood material to 2400 pounds/cubic yard for loose asphalt and concrete available online at:
<http://www.ciwmb.ca.gov/LEAtraining/Resources/CDI/Tools/Calculations.htm>, Accessed: August 24, 2009.

[1047] CIWMB, 2009.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact UT-5 **Construction activities associated with the Project, including demolition of existing facilities, would not generate construction-related solid waste that would exceed the capacity of landfills serving the City and County of San Francisco. (Less than Significant with Mitigation)** ***[Criterion Q.f]***

It is anticipated that the Project would be constructed in phases beginning in 2011, with full build-out by 2031, which represents an approximately 20-year construction period; however, as indicated by Figure II-16, all demolition activities would be concluded by 2028 in both Candlestick Point and HPS Phase II.

Demolition of existing facilities within the Project site would generate approximately 971,785 tons of construction debris. Some construction and demolition debris would be reused on site, while other materials would be transported off site for separation. Materials that cannot be reused or recycled would be transported to the landfills in the area. With implementation of mitigation measure MM UT-5a, the Project Applicant would be required to submit a Waste-Diversion Plan demonstrating strategies to divert at least 75 percent of total construction wastes before receiving building permits. This would reduce construction debris transported to the landfill to 25 percent, or 242,946 tons. At an average density of 1 ton per cubic yard, this equals 242,946 cubic yards, or 0.5 percent of the available capacity at Altamont Landfill as of 2009.

At current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1048] Demolition activities, which generate construction debris, are expected to conclude in 2028 at both Candlestick Point and HPS Phase II, a minimum of one year before the landfill is expected to close. Further, the City requires the diversion of at least 65 percent of construction waste, as also required by mitigation measure MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Project on solid waste would be further reduced. The impact of the construction waste generated by the Project on the capacity of the Altamont Landfill would be less than significant.

Impact UT-6: Hazardous Waste

Impact of Candlestick Point

Impact UT-6a **Construction at Candlestick Point would not require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils that would exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste. (Less than Significant)** ***[Criterion Q.f]***

Construction activities at Candlestick Point, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. These would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur intermittently as construction occurs over the 20-year construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes (refer to Setting).

[1048] CIWMB, 2009.

Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. It is estimated that approximately 450,000 cubic yards of soil from Candlestick Point would require transportation off site (refer to Table II-12 [Summary of Project Site Grading Requirements] in Chapter II [Project Description]). At Candlestick Point, results of soil and groundwater sampling taken at depths of up to 15 feet detected organic compounds and metals at various depths and locations, indicating that chemicals were associated with fill materials. Therefore, some of the 450,000 cubic yards could be contaminated and require disposal under hazardous waste regulations.

Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of Candlestick Point would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact UT-6b **Construction at HPS Phase II would not require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils that would exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste. (Less than Significant)** ***[Criterion Q.f]***

Construction activities at HPS Phase II, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. These would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur intermittently as construction of HPS Phase II occurs over a seven-year construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes (refer to Setting).

Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. At HPS Phase II, investigations have shown that chemicals and radioactive materials are present in soil and groundwater in various locations throughout the HPS Phase II site at levels that require remediation. It is anticipated that the Navy would transfer the property in phases, either as it completes remediation of a phase or as it agrees and get approval to transfer the property before full remediation is complete. If transferred under the latter scenario, it is anticipated that most remediation would be completed at the time of transfer and remaining work would involve groundwater treatment, limited soil excavation, placement of soil and building covers on the site, and monitoring. Contaminated soil or other materials generated as a result of these remediation efforts may require transportation off site to designated TSDs. Refer to Section III.K for an accurate description of work that would be done under an early transfer.

Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of HPS Phase II would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact, and no mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact UT-6 **Construction activities associated with the Project would not require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils that would exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste. (Less than Significant)** ***[Criterion Q.f]***

Construction activities, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. These would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur intermittently during the construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes (refer to Setting). Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. Contaminated soils may require transportation off site and treatment at authorized TSDs.

Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of the Project would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact, and no mitigation is required.

Operational Impacts

Impact UT-7: Operation Solid Waste and Permitted Landfill Capacity

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste.

Table III.Q-8 (Project Solid Waste Generation) shows the projected operational solid waste generation for the Project. The Project would generate a total of approximately 21,827 tons of solid waste annually at full build-out (13,082 tons at Candlestick Point and 8,745 tons at HPS Phase II).

Table III.Q-8 Project Solid Waste Generation

		Candlestick Point			*HPS Phase II*			*Total*		
Use	*Generation Factor (per day)*	*Area or Units*	*Tons per Day or Event*	*Tons per Year*	*Area or Units*	*Tons per Day or Event*	*Tons per Year*	*Area or Units*	*Tons per Day or Event*	*Tons per Year or per Total Number of Events*[a]
Residential	5.653 lbs/unit	7,850 units	22.2	8,103	2,650 units	7.5	2,737.5	10,500 sf	29.7	10,840.5
Retail	0.02600411 lbs/sf	760,000 sf	9.9	3,613.5	125,000 sf	1.6	584.0	885,000 sf	11.5	4,197.5
Office	0.006 lbs/sf	150,000 sf	0.5	182.5	0	0	0	150,000 sf	0.5	182.5
Hotel	0.0108 lbs/sf	150,000 sf	0.8	292.0	0	0	0	150,000 sf	0.8	292.0
R&D	0.006 lbs/sf	0	0	0	2,500,000 sf	7.5	2,737.5	2,500,000 sf	7.5	2,737.5
Performance Venue	2.23 lbs/seat	10,000 seats	5.6[b]	836.3[c]	0	0	0	10,000 seats	5.6	836.3[c]
Stadium	2.23 lbs/seat	0	0	0	65,550 seats[d]	73.1	2,339.2[e]	65,550 seats	2,339.2	2,339.2[e]
Artist Studios/Art Center	0.006 lbs/sf	0	0	0	255,000 sf	0.8	292	255,000 sf	0.8	292.0
Community Facilities	0.006 lbs/sf	50,000 sf	0.15	54.8	50,000 sf	0.15	54.8	100,000 sf	0.3	109.6
Total				***13,082***			***8,745***			***21,827***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

a. Calculated by adding the horizontal columns, rather than calculating total number of units by the generation rate.
b. The Performance venue is projected to be 50 percent attendance.
c. Assumes 150 events per year at 50 percent attendance.
d. Assumes a sold-out event with a 5 percent "no-show" rate.
e. Assumes 12 sold-out games and 20 other sold-out stadium events per year.

Impact of Candlestick Point

Impact UT-7a **Implementation of the Project at Candlestick Point would not generate solid waste that would exceed the capacity of landfills serving the City and County of San Francisco. (Less than Significant with Mitigation)** ***[Criterion Q.f]***

Operation of the Candlestick Point development would generate approximately 13,082 tons of solid waste annually when all uses are fully operational and assuming no waste-reduction measures. This would represent approximately 2 percent of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons). Approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1049] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1050] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes.

The City has implemented a number of aggressive strategies to divert additional solid waste and achieve citywide diversion goals. The City plans to achieve a 75 percent landfill diversion by 2010 and full (100 percent) waste diversion by 2020. The City encourages residents and businesses to pre-sort recyclables, compostable wastes (food scraps and yard waste), and garbage into separate curbside collection containers, sponsors regular public outreach events to educate San Francisco residents and businesses about waste diversion techniques, and conducts special collection events for wastes that are not generally recyclable at curbside (e.g. batteries, electronics, hazardous wastes). For municipal operations, City departments participate in a sustainable purchasing program that encourages the purchase of recyclable materials. The City also sponsors grants for waste diversion research and works with businesses to create market opportunities for materials reuse and recapture. Local waste management providers have upgraded sorting and transfer facilities to maximize the volume of material diverted. On June 9, 2009, the City Board of Supervisors approved an ordinance that requires recycling and composting by residential and commercial uses. All residents and businesses of Candlestick Point would be required to comply with the City's mandatory recycling and composting ordinance. The Project Applicant also proposes to provide recycling facilities for residents and tenants of commercial and retail space, including recycling containers in common areas.

The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste-diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

Consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant shall prepare a Site Waste Management Plan (SWMP) as required by mitigation measure MM UT-7a that will specify the methods by which the Project would divert operational solid waste to assist the City in achieving its diversion goals. The following mitigation measures shall be implemented:

[1049] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Available online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco> (accessed November 5, 2008).

[1050] San Francisco, *Waste Characterization Study: Final Report.* 2008.

MM UT-7a *Site Waste Management Plan. The Project Applicant shall prepare a Site Waste Management Plan (SWMP) in cooperation with the Agency to describe the methods by which the Project shall minimize waste generation not otherwise covered by existing City regulatory policies, with the goal of achieving a diversion rate of at least 72 percent, consistent with the City's existing diversion rate in 2008. The SWMP shall be submitted to the Department of Environment (DOE) for approval prior to the issuance of the first development permit for the Project.*

- As noted, above, the Altamont Landfill is scheduled to close in January 2029, prior to full build-out of Candlestick Point, and the City's existing contract with Altamont Landfill expires in 2014, before build-out of Candlestick Point. Three landfills have been identified as candidates to accommodate the City's solid waste needs after the contract with Altamont Landfill expires. The process of selection and negotiation of a new contract is anticipated to be completed by early 2010. As a primary course of business, the City would continue to ensure that solid waste can be disposed of through new contracts or reinstated contracts with solid waste disposal facilities and through aggressive waste-minimization efforts. Further, implementation of mitigation measure MM UT-7a would provide specific strategies to ensure that the Project reduces solid waste disposed of in landfills in a manner consistent with the City's overarching goal of achieving zero waste by 2020. The impact of operational solid waste generated by the Candlestick Point development on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant.

Impact of Hunters Point Shipyard Phase II

Impact UT-7b **Implementation of the Project at HPS Phase II would not generate solid waste that would exceed the capacity of landfills serving the City and County of San Francisco. (Less than Significant with Mitigation)** ***[Criterion Q.f]***

Operation of the HPS Phase II development would generate approximately 8,745 tons of solid waste annually when all uses are fully operational and assuming no waste reduction measures. This would represent approximately 1.4 percent of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons). As discussed in more detail in Impact UT-7a, the City has implemented a number of aggressive strategies to divert additional solid waste and achieve citywide diversion goals. The City plans to achieve a 75 percent landfill diversion by 2010 and full (100 percent) waste diversion by 2020. In 2008, the City achieved 72 percent landfill diversion.

All residents and businesses of the HPS Phase II would be required to comply with the City's mandatory recycling and composting ordinance. In addition, consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant will prepare a Site Waste Management Plan as required by mitigation measure MM UT-7a that would specify the methods by which the Project would divert operational solid waste to assist the City in achieving its diversion goals.

As noted, above, the Altamont Landfill is scheduled to close in January 2029, after full build-out of HPS Phase II, and the City's existing contract with Altamont Landfill expires in 2014, before build-out of the HPS Phase II. Three landfills have been identified as candidates to accommodate the City's solid waste needs after the contract with Altamont Landfill expires. The process of selection and negotiation of a new contract is anticipated to be completed by early 2010. As a primary course of business, the City would continue to ensure that solid waste can be disposed of through new contracts or reinstated contracts with

solid waste disposal facilities and through aggressive waste minimization efforts. Further, implementation of mitigation measure MM UT-7a would provide specific strategies to ensure that the Project reduces solid waste disposed of in landfills in a manner consistent with the City's overarching goal of achieving zero waste by 2020. The impact of operational solid waste generated by the HPS Phase II on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact UT-7 **Implementation of the Project would not generate solid waste that would exceed the capacity of landfills serving the City and County of San Francisco. (Less than Significant with Mitigation) *[Criterion Q.f]***

At full build-out, the Project would generate approximately 21,827.1 tons annually when all uses are fully operational and assuming no waste reduction measures. This would represent approximately 3.7 percent of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons). As discussed in more detail in Impact UT-7a, the City has implemented a number of aggressive strategies to divert additional solid waste and achieve citywide diversion goals. The City plans to achieve a 75 percent landfill diversion by 2010 and full (100 percent) waste diversion by 2020. In 2008, the City achieved 72 percent landfill diversion.

All residents and businesses of the Project would be required to comply with the City's mandatory recycling and composting ordinance. In addition, consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant will prepare a Site Waste Management Plan as required by mitigation measure MM UT-7a.1 that would specify the methods by which the Project would divert operational solid waste to assist the City in achieving its diversion goals.

- The Altamont Landfill is scheduled to close in January 2029, prior to full build-out of the Project, and the City's existing contract with Altamont Landfill expires in 2014, before build-out of the Project. Three landfills have been identified as candidates to accommodate the City's solid waste needs after the contract with Altamont Landfill expires. The process of selection and negotiation of a new contract is anticipated to be completed by early 2010. As a primary course of business, the City would continue to ensure that solid waste can be disposed of through new contracts or reinstated contracts with solid waste disposal facilities and through aggressive waste minimization efforts. Further, implementation of mitigation measure MM UT-7a would provide specific strategies to ensure that the Project reduces solid waste disposed of in landfills in a manner consistent with the City's overarching goal of achieving zero waste by 2020. The impact of operational solid waste generated by the HPS Phase II on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant.

Impact UT-8: Hazardous Waste Generation

The Project Description identifies proposed land uses, but the specific businesses or activities that could operate in the Project are not known at this time. The analysis assumes nearly all Project uses would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical

at this stage of Project development. It is assumed that a variety of hazardous materials could be used, ranging from R&D, in which a wide variety of hazardous materials would be used, facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios. In addition, remediation activities undertaken as part of the Project (addressed in Section III.K), could generate hazardous substances for disposal. For purposes of the analysis, compliance with existing federal, state, and local laws and regulations pertaining to disposal of hazardous materials would be assumed.

Impact of Candlestick Point

Impact UT-8a **Implementation of the Project at Candlestick Point would not generate hazardous waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste. (Less than Significant) *[Criterion Q.f]***

As noted, the specific businesses or activities that could operate at Candlestick Point are not known at this time. Nearly all Project uses would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this stage of Project development. Hazardous wastes are considered to include waste that is toxic, reactive, ignitable, or corrosive.[1051] The uses at Candlestick Point would consist primarily of office, hotel, residential, and retail, which would not generate significant amounts of hazardous waste. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all anticipated hazardous wastes (refer to Setting). Since no heavy industrial or hospital uses (other than potentially medical or veterinary offices, which would generate hazardous wastes in small quantities) are proposed under the Project, the amount of hazardous wastes that would be generated would be minimal, consisting primarily of household hazardous waste, such as batteries, cleaning products, universal waste (appliances, cellular phones), and small amounts of inorganic wastes such as waste oil from commercial uses. Emptied household hazardous materials and pesticide containers with a capacity of five gallons or less and aerosol containers that are emptied to the maximum extent practical under normal use are exempt from regulation by the EPA.[1052] New residents and businesses would be expected to comply with all hazardous waste regulations, including the disposal of household hazardous waste. Because the minimal amount of hazardous waste that would be generated by the Project could be accommodated by existing facilities, this impact would be less than significant, and no mitigation is required.

Impact of Hunters Point Shipyard Phase II

Impact UT-8b **Implementation of the Project at HPS Phase II would not generate hazardous waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste. (Less than Significant) *[Criterion Q.f]***

As noted, the specific businesses or activities that could operate at HPS Phase II are not known at this time. Nearly all Project uses would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated

[1051] USEPA, 2009.
[1052] USEPA, 2009.

with new proposed uses is not practical at this stage of Project development. Therefore, it is assumed that a variety of hazardous materials could be used, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios. The uses proposed at HPS Phase II would not include Large-Quantity Generators (more than 600 pounds of hazardous waste generation per month). It is not likely that the Project would include Small Quantity Generators (SQG) as defined by the USEPA, which generate more than 60 pounds, but less than 600 pounds, of hazardous waste per month. The amounts of hazardous waste that would be generated by uses at HPS Phase II would not be substantial.

Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all anticipated hazardous wastes (refer to Setting). Since no industrial uses are proposed under the Project, the amount of hazardous wastes that would be generated would be minimal, consisting primarily of household hazardous waste, such as batteries, cleaning products, universal waste (appliances, cellular phones), and small amounts of inorganic wastes such as waste oil from commercial uses. New residents and businesses would be expected to comply with all hazardous waste regulations, including the disposal of household hazardous waste. Because the minimal amount of hazardous waste that would be generated by the Project could be accommodated by existing facilities, this impact would be less than significant, and no mitigation is required.

Combined Impact of Candlestick Point and Hunters Point Shipyard Phase II

Impact UT-8 **Implementation of the Project would not generate hazardous waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste. (Less than Significant)** ***[Criterion Q.f]***

As noted, the specific businesses or activities that could operate under the Project are not known at this time. Nearly all Project uses would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this stage of Project development. Therefore, it is assumed that a variety of hazardous materials could be used in small quantities, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios, and the marina, where small quantities of fuel could be utilized. The uses proposed would not include Large-Quantity Generators (more than 600 pounds of hazardous waste generation per month). It is not likely that the Project would include Small Quantity Generators (SQG) as defined by the USEPA, which generate more than 60 pounds, but less than 600 pounds, of hazardous waste per month. The amounts of hazardous waste that would be generated by uses at the Project would not be substantial.

Since there is no established ceiling on capacities of TSDs in California and adjoining states, it is assumed there would be sufficient capacity to accommodate all anticipated hazardous wastes (refer to Setting). Since no industrial uses are proposed under the Project, the amount of hazardous wastes that would be generated would be minimal, consisting primarily of household hazardous waste and small amounts of inorganic wastes such as waste oil from commercial uses. New residents and businesses would be expected to comply with all hazardous waste regulations, including the disposal of household hazardous waste. Because the

minimal amount of hazardous waste that would be generated by the Project could be accommodated by existing facilities, this impact would be less than significant, and no mitigation is required.

Impact UT-9: Compliance with Solid Waste Regulations

Impact UT-9 **Implementation of the Project would comply with federal, state, and local statutes and regulations related to solid waste. (Less than Significant with Mitigation) *[Criterion Q.g]***

The City currently has a solid waste diversion rate of approximately 72 percent, which exceeds the 50 percent diversion threshold specified in the California Integrated Waste Management Act. By 2010, the City must achieve a 75 percent diversion rate to meet internal citywide goals and to comply with the conditions of an agreement between the City and the Altamont Landfill. The City anticipates that it would achieve a total waste diversion rate of at least 75 percent by 2010 through continued implementation of the City's Zero Waste strategies and recent improvements to the efficiency of sorting and transfer facilities. Development within the Project site would meet or exceed all of the City's solid waste diversion requirements for new development. Mitigation measure MM UT-7a.1 requires the Project Applicant to provide a Site Waste Management Plan demonstrating the manner in which the Project would comply with these requirements. The Project Applicant proposes to provide recycling facilities for residents and tenants of commercial and retail space. Implementation of mitigation measures MM UT-7a.1, MM UT-7a.2, and MM UT-5a would ensure compliance with applicable regulations pertaining to solid waste. Development of the Project would not conflict with regulatory policies pertaining to solid waste and this impact would be less than significant.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts associated with solid waste is the City of San Francisco. The past and present development in the City is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process.

Development of the Project would comply with federal, state, and local statutes and regulations. All cumulative development in the City would be expected to meet or exceed all solid waste diversion requirements for new development. Therefore, there would be no cumulative problem with respect to this threshold. The Project would comply with all applicable regulations pertaining to solid waste, both from construction and operation, and the cumulative impact would be less than significant.

There is a growing landfill capacity problem for municipal solid waste and construction waste in the State of California, and various approaches are being explored and implemented to help reduce the impact of the increasing amounts of solid waste generated by a growing population. Even with implementation of increased recycling programs, the future capacity of landfills to accommodate the State's solid waste is uncertain. There could be a shortage of landfill space in the future, as some landfills are nearing capacity or would close during the planning period for the General Plan. This is a potentially significant cumulative problem.

In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1053]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs.

Cumulative development in the City would generate varying amounts of solid waste that would decrease the remaining capacity of servicing landfills. The City has implemented a number of aggressive strategies to divert additional solid waste and achieve citywide diversion goals. The City plans to achieve a 75 percent landfill diversion by 2010 and full (100 percent) waste diversion by 2020, and its contribution of solid waste to landfills is anticipated to continue to diminish over time. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled. The Green Building Ordinance, Chapter 7 of the Environment Code, establishes LEED® Silver level as the standard for all City building projects, which can include the goal of diverting 75 percent of construction and demolition debris from landfills for each project. Therefore, contributions from the Project, combined with cumulative projects, which would also be subject to the Green Building Ordinance, would not substantially contribute to landfills. The amount of waste generated by the Project would be a relatively small percentage (3.7 percent) of the solid waste generated by the City, without any recycling efforts beyond a 75 percent diversion rate. The Project Applicant would implement strategies for reduction of construction waste, as identified, above, and would achieve a construction waste diversion rate of at least 75 percent. Implementation of mitigation measure MM UT-7a would provide for preparation of a waste diversion plan that would address waste-diversion strategies for areas not otherwise covered by existing City policies. With compliance with the Green Building Ordinance and implementation of on-site recycling, the Project would not make a cumulatively considerable contribution to any potential cumulative impact with regard to landfill capacity. The Project's cumulative impact would be less than significant.

Development of cumulative projects in the City of San Francisco could result in additional hazardous waste generation, depending on the uses proposed. As there are no capacity issues with regard to transport or treatment of hazardous waste, as noted, above, the cumulative projects would not contribute hazardous waste that would exceed the capacity of the TSDs authorized to handle this waste. Even if there were a significant cumulative problem with regard to hazardous waste, since no heavy industrial or hospital uses are proposed under the Project, the amount of hazardous wastes that would be generated would be minimal, consisting primarily of household hazardous waste and small amounts of inorganic wastes such as waste oil from commercial uses, and the Project would not make a considerable contribution to such cumulative impact. New residents and businesses would be expected to comply with all hazardous waste

[1053] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.

regulations, including the disposal of household hazardous waste. The Project's cumulative impact with regard to hazardous waste would, therefore, be less than significant.

Electricity, Natural Gas, and Telecommunications

III.Q.11 Setting

Utilities within the Project area are located above and below ground. Above-ground level utilities include overhead electrical distribution and transmission lines. Underground utilities include electrical, gas, TV/cable, fiber optics communications, and telephone. Pacific Gas & Electric (PG&E) currently provides natural gas and electricity services to Candlestick Point and Hunters Point. Project consumption of electricity and natural gas is addressed in Section III.R. The following section discusses utility infrastructure and how the Project would affect distribution of those resources.

The PG&E system is composed of 123,054 circuit miles of electric distribution lines and 18,610 circuit miles of interconnected transmission lines, 40,123 miles of natural gas distribution pipelines and 6,136 miles of transportation pipelines.[1054] PG&E produces or buys its power from a mix of conventional and renewable energy sources. PG&E acquires electricity from over 400 independent producers as well as some out-of-state producers. The electricity is carried over the bulk grid, a network of high-voltage transmission lines that connect power plants to substations. Substations then switch the electricity from the transmission system to the distribution system, transforming the voltage from high to low in the process. The distribution system includes main, or primary, lines, as well as secondary lower-voltage lines, which deliver electricity either overhead or underground, distribution transformers, which lower voltage to usage levels, and switching equipment, which allow the lines to be connected together in various configurations.

PG&E also operates a hydroelectric system built along 16 river basins stretching nearly 500 miles from Redding in the north to Bakersfield in the south. Water used to power the hydroelectric system comes from more than 100 reservoirs located mostly in the higher elevations of California's Sierra Nevada mountain range. The system includes 68 powerhouses that have a total generating capacity of 3,896 megawatts. PG&E also owns the Diablo Canyon Power Plant, located in San Luis Obispo County, California.

The Project area currently has a 12kV electrical connection to the PG&E grid. Such a connection is capable of supporting an operating load of approximately 9MW.

Natural gas is currently provided to the Project site by PG&E. PG&E's natural gas piping system delivers natural gas from three major sources: California, Southwestern US, and Canada. Natural gas from underground wells is cleaned and treated, removing sand, dust, and water, and compressed for storage in underground storage fields. A compressor station increases gas pressure to move it into storage or through transmission lines. High-pressure transmission lines transport the natural gas to the distribution system via a network of mostly underground lines. Regulators reduce the pressure of the gas entering the distribution system, which consists of both high- and low-pressure mains that distribute gas from the regulator station. The Project's on-site infrastructure would connect to the existing infrastructure at Crisp and Griffith, Innes and Donahue, and at Harney Way.

[1054] PG&E, 2009.

Telephone, television, and internet services could be provided by any one of a number of service providers in the City of San Francisco.

III.Q.12 Regulatory Framework

Federal

There are no federal policies pertaining to electricity, natural gas, or telecommunications.

State

The California Public Utilities Commission regulates investor-owned electric and natural gas utilities operating in California, including PG&E. There are no State policies pertaining to electricity, natural gas, or telecommunications.

Local

Section 1636 of the City of San Francisco Subdivision Code requires that the subdivider provide electric, gas and communication services connected to the appropriate public utility's distribution system. Improvement plans, including an infrastructure plan, must be submitted to the City for approval following approval of the Tentative Map and prior to filing the Final Map. The Project Applicant would be required to obtain approval of the improvement plans pursuant to Article 31, Section 3100 of the San Francisco Health Code, which governs development at Hunters Point Shipyard.

III.Q.13 Impacts

Significance Criteria

The CCSF and Agency have not formally adopted significance standards for impacts related to dry utilities, but generally consider that implementation of the Project would have significant impacts on these resources if it were to:

Q.h Require or result in the construction of new or expansion of existing utility infrastructure, the construction of which could cause significant environmental effects

Q.i Result in a determination by the utility service provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments

Analytic Method

The existing dry utility (electricity, natural gas, and telecommunications/cable) infrastructure is described, and any required extensions of this infrastructure to accommodate the Project are identified. Project requirements are then compared against the capacity of the service providers to accommodate Project needs.

Construction Impacts

Significance criterion Q.h, above, indicates that the Project would have a significant adverse effect if it would require or result in the construction of new facilities or expansion of existing utility infrastructure, the construction of which could cause significant environmental effects. The proposed improvements within the HPS Phase II and Candlestick Point boundaries include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. In addition, the joint trench will include conduits and conductors for street lighting and traffic signals. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into the HPS Phase 2 project site. This could include a new substation within the project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Project.

Operational Impacts

Impact UT-10: Utility Service Capacity

Impact UT-10 **Implementation of the Project would not require extension of dry utility infrastructure that would exceed the capacity of the services providing such utilities. (Less than Significant)** ***[Criterion Q.i]***

The Project site is currently served by the PG&E electrical distribution system. The Project has not yet selected a service provider for electricity, which would be either PG&E or SFPUC. The Project would provide a joint trench network for the Candlestick Point and HPS Phase II developments that would include electrical, communications, and gas utilities. In addition, the joint trench would include conduits and conductors for street lighting and traffic signals. Major and minor joint trenches would be routed through the street network to provide power, communications, and gas facilities to the development areas.

The projected electricity load for the fully developed Project is estimated to be approximately 44 MW by the year 2021. This value includes the load assumption for the stadium and includes a number of energy-efficiency and low-energy design measures.[1055] The Project would require an upgrade of the existing connection to the grid. The electricity provider may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into the Project site and improvements could include a new substation within HPS Phase II. Although the Project would result in an increase in electricity demand in the City, it would comply with the energy-conservation standards specified in Title 24 of the CCR and, in fact, would achieve a 15 percent improvement over Title 24 requirements. Further, implementation and extension of utility infrastructure would be fully funded and constructed by the Project Applicant. As part of its Infrastructure Plan, the Project Applicant would identify and implement all needed upgrades to the distribution system, including installation of new transformers, additional distribution lines, switches, and/or potentially an electrical substation, as noted. The Infrastructure Plan would also be subject to the approval of the City to ensure that adequate capacity is provided to accommodate the Project. As required

[1055] Arup, March 2009.

by law, all utility connections would be constructed in accordance with the Uniform Building Code, City Ordinances, and Department of Public Works standards to ensure an adequately sized and properly constructed electrical transmission and conveyance system.

Similarly, the on-site natural gas distribution system would connect to the existing PG&E system at Crisp and Griffith, Innes and Donahue, and at Harney Way. All natural gas connections would be constructed in accordance with the Uniform Building Code, City Ordinances, and Department of Public Works standards to ensure an adequately sized and properly constructed natural gas transmission and conveyance system. Further, implementation and extension of utility infrastructure would be fully funded and constructed by the Project Applicant. The Infrastructure Plan would contain a comprehensive description of all natural gas distribution upgrades required by the Project, as well as the specific locations of all connections. The Plan would be subject to the approval of the City prior to the issuance of development permits.

Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Telecommunications and cable services would be provided for the Project by any one of a number of providers in the San Francisco area. The service providers would provide any needed upgrades to their distribution systems, including new switching and routing equipment, to accommodate the demand of the Project. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR.

The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant. No mitigation is required.

Cumulative Impacts

The geographic context for an analysis of cumulative impacts associated with dry utilities would be the service areas of the respective providers. For electricity, it would be either the service area of PG&E or the SFPUC. For natural gas, the context would be the service area of PG&E. Telecommunications and cable have varying service areas depending on the provider. Telecommunications providers are "on-demand" services, providing additional infrastructure as demand grows. These service providers would extend their infrastructure to accommodate growth within their service areas. The past and present development in these service areas is generally described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. The service area of PG&E, however, extends beyond the City and County of San Francisco; PG&E provides natural gas and electric service to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California. Its service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process.

Development of cumulative projects, in combination with the Project, would increase demand for electricity, natural gas, and telecommunications services. All cumulative projects within the City of San Francisco would be required to comply with the subdivision code and other applicable City codes, which, among other provisions, require that infrastructure plans be submitted for approval to demonstrate that adequate infrastructure exists or would be constructed to accommodate the project. Other jurisdictions in the providers' service areas have similar requirements, particularly for larger projects, to ensure that project needs can be accommodated by various public services. Since California's energy crisis in 2001, utility planning is done in a much more coordinated manner to achieve adequacy of supply, to establish and oversee formal operational standards for running the bulk power systems, and to address security concerns for critical electrical infrastructures.[1056] This coordination is administered under mandatory procedures set up by the electric power industry's electricity reliability organization (the North American Electric Reliability Corporation), with oversight provided by the Federal Energy Regulatory Commission and the US Department of Energy.[1057] This planning effort has resulted in a more dependable electricity supply to the state, and new transmission lines are being built throughout California and elsewhere to ensure a steady and reliable supply of electricity. In addition, all projects in California are subject to Title 24 requirements for energy conservation. New energy-conservation measures recommended by the Attorney General and CAPCOA (refer to Section III.S), further reducing energy consumption. Therefore, development of cumulative projects is not anticipated to result in demand exceeding supply, and there would be no significant cumulative impact. The Project's infrastructure improvements would ensure that necessary upgrades to the electrical distribution system are provided and that capacity of the service provider to provide electricity to the Project and existing customers would not be exceeded. The Project's cumulative impact would be less than significant.

With regard to natural gas, substantial expansion projects have been completed around the country in the last few years. For example, during 2008, at least 84 natural gas pipeline projects were completed, adding close to 4,000 miles of natural gas pipeline and about 43.9 billion cubic feet per day of new capacity to the national natural gas pipeline grid.[1058] New exploration and drilling projects are also underway. These efforts will help accommodate the country's needs for natural gas. PG&E similarly develops new sources of natural gas to serve its customers. All projects in California are subject to Title 24 requirements for energy conservation. Therefore, development of cumulative projects is not anticipated to result in demand exceeding natural gas supply, and there would be no significant cumulative impact. The Project's infrastructure improvements would ensure that necessary upgrades to the natural gas distribution are provided and that capacity of PG&E to provide natural gas to the Project and its existing customers would not be exceeded. The Project's cumulative impact would be less than significant.

Telecommunications services are provided on demand, and service providers expand their distribution systems as needed to accommodate growth. Cumulative projects would increase demand for these services, but would be accommodated by any one of a number of providers in the San Francisco area. Therefore, there would be no significant cumulative impact. The Project's telecommunications needs would be accommodated by these providers, and demand would not exceed supply. Therefore, the Project's cumulative impact would be less than significant.

[1056] California Department of Energy, 2009.
[1057] Energy Information Administration, http://www.eia.doe.gov/ Accessed 10/27/09.
[1058] Energy Information Administration, http://www.eia.doe.gov/ Accessed 10/27/09.

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SECTION III.R ENERGY

III.R.1 Introduction

This section assesses the significance of the use of energy, including electricity, natural gas and gasoline and diesel fuels, by the Project activities. It discusses existing energy use patterns at the Project site and examines whether Project activities would result in the consumption of large amounts of fuel or energy, or use of such resources in a wasteful manner. A number of factors are considered when weighing whether a project would use a proportionately large amount of energy or whether the use of energy would be wasteful in comparison to other projects. Factors such as the use of on-site renewable energy features (such as photovoltaics) or energy conservation features or programs are considered. This section analyzes the potential for both Project level and cumulative environmental impacts. The analysis in this section concludes that no potentially significant or significant environmental impacts would result from the Project's energy usage; therefore, no mitigation measures are required.

This section is based upon consumption and infrastructure information from Pacific Gas & Electric (PG&E) and energy use studies from the California Energy Commission (CEC).[1059] The Project's energy use was modeled using factors from the *Climate Change Technical Report for the CP-HPS Development Plan* (included as Appendix S [Climate Change Technical Report]); the California Department of Transportation's *California Motor Vehicle Stock, Travel and Fuel Forecast*;[1060] and land use data from Chapter II (Project Description).[1061]

Refer to Section III.S (Greenhouse Gas Emissions) for a discussion of the relationship between energy consumption and greenhouse gas emissions. Refer to Section III.Q (Utilities) for a discussion of water consumption.

III.R.2 Setting

■ Electricity

Overview

Electricity is a current of energy generated by combustion of fuels, nuclear fission, hydroelectric or wind power, photovoltaics/solar panels, or geothermal technologies. The capacity of electricity infrastructure[1062] is generally discussed in terms of kilowatts (kW), a measure of energy intensity, while total electricity consumption is discussed in terms of kilowatt-hours (kWh), equal to one thousand watts over a one-hour period.

[1059] Individual studies and data sources are cited throughout the Setting.
[1060] California Department of Transportation (Caltrans), *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009.
[1061] Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor, as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[1062] Local electrical capacity is a function of the capacity of the transmission network to convey power to a service area, the capacity of the local substations to "step down" the power to deliverable voltages, and of the adequacy of the local distribution network to deliver power to end users.

On a per capita basis, Californians consume approximately 7,032 kilowatt-hours (kWh) of electricity annually, the lowest statewide per capita consumption in the country.[1063] In comparison, the average annual US per capita consumption is 12,347 kWh.[1064] However, California's overall electricity consumption is second only to that of Texas.[1065] The large statewide demand for electricity creates economic vulnerability, as seen during the Western Energy Crisis of 1996 (a period of energy price fluctuation triggered by deregulation of the energy industry).[1066] Although California has made substantial progress in reducing energy consumption on a per capita basis, total demand for electricity is expected to increase with population and economic growth. The State recognizes that efficiency programs alone cannot address demand and that such programs must be supplemented with programs designed to ensure a stable, reliable energy supply.[1067] State agencies, utility providers, and the general public have invested in renewable energy development as a means of achieving energy stability. Refer to the discussion of renewable energy in the "Renewable and Alternative Energy" section and to Section III.R.3 (Regulatory Framework).

One of the difficulties in managing electricity consumption is that, once generated, electricity cannot be stored. Thus, a utility provider's overall generation capacity must be sized to accommodate peak demand. Load management strategies, which are energy efficiency strategies that focus on minimizing electricity demand during peak demand periods, allow providers to use smaller generation facilities and transmission infrastructure.[1068] Title 24 energy standards, discussed in Section III.R.3, weight consumption during peak periods to emphasize the need for peak hour conservation. Strategies designed to minimize long-term use are also helpful in reducing the need for infrastructure expansions. The Project's strategies to reduce peak loads and reduce overall energy demand are discussed in Section III.R.4 (Impacts).

The City receives approximately 76 percent of its electricity from PG&E.[1069] The remaining electricity is generated by hydroelectric facilities associated with HHWP that operate in the western Sierra Nevada Mountains (16 percent) and by small local generation facilities (8 percent).[1070] Table III.R-1 (Electricity Consumption in San Francisco, by Land Use [2007]) depicts energy demand by land use type in San Francisco. As shown in Table III.R-1, commercial uses account for nearly 60 percent of all electricity consumption, while residential uses account for approximately 28 percent of the usage.[1071] A total of 5,155 million kWh are consumed annually in San Francisco.

[1063] California Energy Commission, *US Per Capita Electricity Use by State in 2005,* website: http://energyalmanac.ca.gov/electricity/us_per_capita_electricity_2005.html, accessed August 17, 2009.
[1064] California Energy Commission, *US Per Capita Electricity Use by State in 2005,* website: http://energyalmanac.ca.gov/electricity/us_per_capita_electricity_2005.html, accessed August 17, 2009.
[1065] California Energy Commission, *US Per Capita Electricity Use by State in 2005,* website: http://energyalmanac.ca.gov/electricity/us_per_capita_electricity_2005.html, accessed August 17, 2009.
[1066] Federal Energy Regulatory Commission, *The Western Energy Crisis, the Enron Bankruptcy, and FERC's Response,* website: http://www.ferc.gov/industries/electric/indus-act/wec/chron/chronology.pdf, accessed August 27, 2009.
[1067] California Energy Commission, *2007 Integrated Energy Policy Report*, CEC-100-2007-008-CMF.
[1068] California Energy Commission, *Load Management Standards Proceeding,* website: http://www.energy.ca.gov/load_management/, accessed August 20, 2009.
[1069] City and County of San Francisco, *Environment Code,* Chapter 18: Solar Energy Incentive Program, accessed August 20, 2009.
[1070] City and County of San Francisco, *Environment Code,* Chapter 18: Solar Energy Incentive Program, accessed August 20, 2009.
[1071] Rocky Mountain Institute, *An Energy Resource Investment Strategy for the City and County of San Francisco,* website: http://sfwater.org/detail.cfm/MC_ID/12/MSC_ID/138/MTO_ID/239/C_ID/1346, accessed August 20, 2009.

Table III.R-1 Electricity Consumption in San Francisco, by Land Use (2007)		
Land Use	***Total Consumption (million kWh)***	***Percent of Total Consumption***
Commercial	3,087.59	60%
Residential	1,454.81	28%
Industrial	76.60	1%
Construction	35.61	1%
Water Supply	302.85	6%
Other	197.39	4%
Total	***5,154.85***	***100%***

SOURCE: California Energy Commission, *County Electricity Deliveries by NAICS: San Francisco County*. http://ecdms.energy.ca.gov/utilbynaicselec.asp (accessed August 27, 2007).

Project Site Demand

Existing electricity use at the Project site was estimated by applying electricity use factors from the Climate Change Technical Report (Appendix S) to existing land uses floor areas and unit totals. Table III.R-2 (Existing Project Site Electricity Demand) shows existing electricity demand at Candlestick Point and HPS Phase II. A total of 9,468 MWh of electricity was consumed at the Project site in 2008. Of this total, approximately 6,026 MWh (64 percent) was consumed at Candlestick Point, and approximately 3,442 MWh (36 percent) was consumed at HPS Phase II.

Table III.R-2 Existing Project Site Electricity Demand							
		Candlestick Point		***HPS Phase II***		***Project Site Total***	
Type of Use	***Energy Use Factor (MWh/gsf or unit)[a,b,c]***	***Existing Development[d]***	***MWh Consumed Annually[e]***	***Existing Development[d]***	***MWh Consumed Annually[e]***	***Existing Development***	***MWh Consumed Annually***
Residential Units	3.617	256 units	926	—	—	256 units	926
Artist Studios	0.0153	—	—	225,000 gsf	3,442	225,000 gsf	3,442
Stadium	N/A	—	5,100	—	—	—	5,100
Total			***6,026***		***3,442***		***9,468***

SOURCES:

Existing electricity demand was estimated based on minimal compliance with 2005 Title 24 standards. Because existing development at the Project site predates adoption of the Title 24 standards, existing consumption may be somewhat higher than reported. Energy consumption is reported for uses that were operational as of September, 2009.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor is in the "Electricity Delivered, Total" column and the "Minimally Title 24 Compliant (2005)" row. The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. The energy use factor cited for the artist studios is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factor is in the Hunters Point Shipyard sub-table in the "Total Energy Intensity" column and the "Community Space and Artist Studio" row. The factor was converted from kWh to MWh.

c. Energy use for the Candlestick Park stadium was estimated in: City and County of San Francisco, 2004. *Climate Action Plan*, Table 2-4.

d. Based on buildout floor areas provided in Table II-2 (Existing and Proposed Uses) of this EIR.

e. Calculated by multiplying energy use factor by number of units or gsf. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

Natural Gas

Overview

Natural gas is a liquid or gaseous fuel composed primarily of methane from decomposed plant and animal material. It can take many different forms depending on the source of extraction and the means by which it is processed following extraction. Natural gas is commonly associated with fossil fuel reservoirs, such as coal beds and petroleum reservoirs, but it is also biogenically produced in wetlands and marshes. Decomposition of wastes in landfills produces methane emissions that can be used as a fuel similar to natural gas.

Because of its low molecular density, natural gas is difficult to store and transport over long distances. Currently, PG&E imports its natural gas from Canada through PG&E-owned transmission pipelines. The state's natural gas supply may be supplemented when necessary from the Rocky Mountains, Texas, and New Mexico, as well as in-state production. Sources of natural gas available to California consumers are expected to decrease over time, even as population increases.[1072] However, natural gas is in high-demand as a fuel for electricity generation because it releases fewer emissions per unit of energy than oil or coal-based fuels. Over half of the natural gas consumed in California annually goes towards the production of electricity.[1073] California's reliance on imported natural gas supplies leaves the state vulnerable to price fluctuations and supply disruptions.[1074]

At 60,000 cubic feet per year (approximately 62 million British thermal units [Btu]),[1075] California's per capita natural gas consumption is lower than the national per capita average of 67,900 cubic feet per year (70 million Btu).[1076] However, in terms of total statewide natural gas consumption, California is second only to Texas. As with electricity, California's high statewide natural gas consumption results from the state's large population and its vigorous economy. While California's successful efficiency programs and its reliance on renewable sources of electricity are expected to slow the demand for natural gas relative to the demand in other parts of the nation, competition for a limited natural gas supply is increasing with corresponding increases in population and economic activity.[1077]

Like electricity, natural gas in San Francisco is supplied by PG&E. As shown in Table III.R-3 (Natural Gas Consumption in San Francisco, by Land Use [2007]), it is consumed largely by residential uses (54 percent) and commercial uses (34 percent).[1078] A total of approximately 28,918,000 million Btu is consumed annually in the City.

[1072] California Energy Commission, *2007 Integrated Energy Policy Report*, CEC-100-2007-008-CMF.
[1073] California Energy Commission, *California Natural Gas Data and Statistics,* website: http://www.energyalmanac.ca.gov/naturalgas/index.html, accessed August 20, 2009.
[1074] California Energy Commission, *California Natural Gas Data and Statistics,* website: http://www.energyalmanac.ca.gov/naturalgas/index.html, accessed August 20, 2009.
[1075] 1 Cubic Foot = 1,028 Btu.
[1076] Based on 2005 data, the most current information published by the California Energy Commission as of the date of publication of this EIR.
[1077] California Energy Commission, *Overview of Natural Gas in California: Natural Gas Costs and Prices*, website: http://www.energyalmanac.ca.gov/naturalgas/overview.html, accessed August 27, 2007.
[1078] California Energy Commission, *County Gas Deliveries by NAICS: San Francisco County,* website: http://ecdms.energy.ca.gov/utilbynaicsgas.asp, accessed August 27, 2007.

Table III.R-3 Natural Gas Consumption in San Francisco, by Land Use (2007)

Land Use	*Total Consumption (million British thermal units [Btu])*	*Percent of Total Consumption*
Residential	15,504,000	54%
Commercial	9,971,000	34%
Industrial	357,000	1%
Construction	182,000	1%
Water Supply	6,000	0%
Other	2,898,000	10%
Total	***28,918,000***	***100%***

SOURCE: California Energy Commission, *County Gas Deliveries by NAICS: San Francisco County*, converted from therms to Btu (1 therm = 100,000 Btu). http://ecdms.energy.ca.gov/utilbynaicsgas.asp (accessed August 27, 2007).

Project Site Demand

Existing natural gas use at the Project site was estimated by applying natural gas use factors from the Climate Change Technical Report (Appendix S) to existing land uses floor areas and unit totals. As shown in Table III.R-4 (Existing Project Site Natural Gas Demand), an estimated total of 14,253 million British thermal units (MBtu)[1079] of natural gas was consumed at the Project site in 2008. Of this total, approximately 9,010 MBtu (63 percent) was consumed at Candlestick Point, with the remaining 5,243 MBtu (37 percent) consumed at HPS Phase II.

Table III.R-4 Existing Project Site Natural Gas Demand

		Candlestick Point		*HPS Phase II*		*Project Site Total*	
Type of Use	*Energy Use Factor (MBtu/gsf or unit)*[a,b,c]	*Existing Development*[d]	*MBtu Consumed Annually*[e]	*Existing Development*[d]	*MBtu Consumed Annually*[e]	*Existing Development*	*MBtu Consumed Annually*
Residential Units	0.0400	256 units	10	—	—	256 units	10
Artist Studios	0.0233	—	—	225,000 gsf	5,243	225,000 gsf	5,243
Stadium	N/A	—	9,000	—	—	—	9,000
Total			***9,010***		***5,243***		***14,253***

SOURCE:

Existing natural gas demand was estimated based on minimal compliance with 2005 Title 24 standards. Because existing development at the Project site predates adoption of the Title 24 standards, existing consumption may be somewhat higher than reported. Energy consumption is reported for uses that were operational as of September, 2009.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor is in the "Electricity Delivered, Total" column and the "Minimally Title 24 Compliant (2005)" row. The factor was converted from kBtu to MBtu (1 MBtu = 1,000 kBtu).

b. The energy use factor cited for the artist studios is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factor is in the Hunters Point Shipyard sub-table in the "Total Energy Intensity" column and the "Community Space and Artist Studio" row. The factor was converted from kBtu to MBtu.

c. Energy use for the Candlestick Park stadium was estimated in: City and County of San Francisco, 2004. *Climate Action Plan,* Table 2-4.

d. Based on buildout floor areas provided in Table II-2 (Existing and Proposed Uses) of this EIR.

e. Calculated by multiplying energy use factor by number of units or gsf. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

[1079] One Btu is approximately the amount of energy needed to heat one pound of water one degree Fahrenheit.

Gasoline and Diesel

Overview

Gasoline and diesel, both derived from petroleum (also known as crude oil), are the two most common fuels used for vehicular travel. According to the CEC, the State relies on petroleum-based fuels for 96 percent of its transportation needs.[1080] In 2006, Californians consumed an estimated 20 billion gallons of gasoline and diesel fuel for transportation, an increase of nearly 50 percent over the last 20 years.[1081]

Although California refines much of its oil reserves in the State (approximately 39 percent), much of the petroleum consumed is produced out of state (approximately 20) or is supplied by foreign sources (41 percent).[1082] California experienced a 23 percent decrease in production between 1996 and 2006 as a result of several factors, including declining fuel reserves and economic and regulatory factors.[1083] Because California is one of the top oil-producing states in the country, the State has been historically able to meet a large portion of its internal demand for petroleum resources through in-state sources. However, as with other energy resources, total demand for energy resources is predicted to rise over the coming decades as production capacity and extraction volume simultaneously decrease. In addition, unlike electricity and natural gas fuels, per capita consumption of petroleum products continues to rise in the Bay Area in spite of conservation programs.[1084]

The declining supply of in-state petroleum products, coupled with increasing demand, has resulted in an increased need for imported oil resources. According to the CEC, California's reliance on crude oil imports will increase from 405 million barrels in 2005 to between 585 million (low forecast) and 685 million (high forecast) barrels in 2025.

Approximately 158 million gallons of gasoline and 11 million gallons of diesel were consumed in San Francisco for transportation in 2007.[1085] By 2030, consumption of transportation-related fossil fuels is expected to increase by about 57 percent citywide.

Project Site Demand

According the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*,[1086] the current annual vehicle miles traveled (VMT) to and from the Project site is about 58.7 million miles. As shown in Table III.R-5 (Existing Project Site Petroleum Demand), based on existing trip generation and

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[1080] California Energy Commission, *The Role of a Low Carbon Fuel Standard in Reducing Greenhouse Gas Emissions and Protecting Our Economy,* website: http://gov.ca.gov/index.php?/fact-sheet/5155/, accessed August 20, 2009.
[1081] California Energy Commission, Fuels and Transportation Division, website: http://www.energy.ca.gov/transportation/index.html, accessed August 20, 2009.
[1082] "Production" generally refers to the petroleum mining and extraction process, while "refinement" refers to the post-extraction processing necessary to purify petroleum fuels into a usable form. California Energy Commission, Fuels and Transportation Division, website: http://www.energy.ca.gov/transportation/index.html (accessed August 20, 2009).
[1083] California Energy Commission, California Crude Oil Production and Imports http://www.energy.ca.gov/2006publications/CEC-600-2006-006/CEC-600-2006-006.pdf.
[1084] California Energy Commission, *2007 Integrated Energy Policy Report*, CEC-100-2007-008-CMF.
[1085] California Department of Transportation (Caltrans), *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009.
[1086] CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study,* 2009.

fuel efficiency data, the existing uses at the Project site result in a current demand for approximately 2.70 million gallons of gasoline and 0.17 million gallons diesel fuels per year.

Table III.R-5 Existing Project Site Petroleum Demand

	Existing Annual VMT (million miles travelled)	*Average Countywide Vehicle Fuel Efficiency (2008)*	*Existing Total Fuel Consumption (million gallons)*	*Existing Gasoline Consumption (million gallons)*	*Existing Diesel Consumption (million gallons)*
Candlestick Point	58.7	20.41	2.87	2.70	0.17
Hunters Point Shipyard	0	20.41	0	0	0
Total	***58.7***		***2.87***	***2.70***	***0.17***

SOURCES:

a. Equals the estimated VMT (3,495 million miles travelled) divided by the estimated total transportation fuel consumed (171.27 million gallons) for San Francisco County, as reported in: California Department of Transportation (Caltrans), *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009

b. Annual VMT was calculated by PBS&J based on trip generation information and average trip lengths reported in: CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study,* 2009.

c. On average 94 percent of the transportation fuels consumed in San Francisco were gasoline fuels, while 6 percent were diesel fuels, as reported in: California Department of Transportation (Caltrans), *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009.

d. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

Renewable and Alternative Energy

Renewable Electricity

Renewable electricity generation methods provide a number of benefits. Such methods reduce the State's dependence on the use of imported fossil fuels (including natural gas), reduce the State's vulnerability to price fluctuations in energy markets, and serve to minimize greenhouse gas emissions (refer to Section III.S). The CEC currently defines solar, geothermal, wind, biomass, and small-scale hydroelectric generation methods as renewable electricity sources.[1087,1088] Compared to other utility providers in the State, PG&E's overall electricity generation portfolio contains a relatively high percentage of renewable sources. In 2007, PG&E generated 12 percent of its total electricity through renewable sources, including biomass, small hydroelectric, geothermal, and wind. The remainder of PG&E's generation portfolio includes natural gas combustion (47 percent), nuclear fission (23 percent), large-scale hydroelectric (13 percent), coal combustion (4 percent), and other sources (1 percent).[1089] Although development of renewable energy sources is generally beyond the scope of local development planning, individual development projects may include small-scale generation features, such as photovoltaics, that can be connected to, and supply supplementary electricity to, the primary power grid. In addition, the electricity rates paid by San Francisco consumers support development of future renewable sources, as mandated by state law.

[1087] California Energy Commission, *California's Renewable Energy Programs,* website: http://www.energy.ca.gov/renewables/index.html, accessed August 19, 2009.

[1088] The California Energy Commission considers "renewable" electricity to be electricity produced through use of a rapidly renewable resource, such as sunlight, wind, geothermal energy, etc. In addition, generation of renewable electricity does not result in substantial environmental impacts, such as the production of harmful wastes or harm to sensitive species.

[1089] California Energy Commission, *Sources of Electricity for Major Utilities in California,* website: http://www.pgecorp.com/corp_responsibility/reports/2007/environment/energy-future.html, accessed August 19, 2009.

Currently, there is no renewable electricity generation infrastructure on the Project site.

Alternative Transportation Fuels, Technologies, and Strategies

Commercially available alternative transportation fuels include biodiesel, ethanol, hydrogen, methanol, natural gas, and electricity.[1090] Some of these fuels, such as natural gas, are cleaner-burning petroleum-based alternatives to gasoline and diesel. Other products, such as ethanol and biodiesel, are non-petroleum fuels. Although some alternative fuels can be used in a traditional combustion motor, other alternatives, such as electricity, are based on alternative propulsion technologies. The California Air Resources Board is investigating a number of low-carbon fuel strategies.

Although alternative transportation fuels and technologies could potentially minimize the use of petroleum products, land use planning strategies that result in denser, more compact development are also needed to reduce the need for vehicular travel. Refer to Section III.S and Section III.B (Land Use and Plans) for a description of adopted land use policies promoting such forms of development.

The joint trench systems for the Candlestick Point and Hunters Point Shipyard Phase II development plans would include electrical, communications and gas utilities. A joint trench network would be developed for each development site. Major and minor joint trenches would be routed through the street network to provide power, communications and gas facilities to the development areas.

III.R.3 Regulatory Framework

Federal

Corporate Average Fuel Efficiency Standards

In response to the *Massachusetts et al. vs. Environmental Protection Agency et al.* ruling, the Bush Administration issued an executive order on May 14, 2007, directing the USEPA and Department of Transportation to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. On December 19, 2007, the Energy Independence and Security Act of 2007 (discussed below) was signed into law, which requires an increased Corporate Average Fuel Economy (CAFE) standard of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020. EISA requires establishment of interim standards (from 2011 to 2020) that will be the "maximum feasible average fuel economy" for each fleet. On October 10, 2008, the National Highway Traffic Safety Administration (NHTSA) released a final environmental impact statement analyzing proposed interim standards for model years 2011 to 2015 passenger cars and light trucks. NHTSA issued a final rule for model year 2011 on March 23, 2009.[1091]

On May 19, 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the US auto industry. The proposed rulemaking is a collaboration between the DOT and USEPA with the support of the United Auto Workers. The proposed federal standards apply to passenger cars, light-

[1090] US Department of Energy, *Alternative and Advanced Fuels,* website: http://www.afdc.energy.gov/afdc/fuels/index.html, accessed August 20, 2009.
[1091] DOT and USEPA, 2009. *Joint Rulemaking to Establish Vehicle CAFE and GHG Emissions Standards,* http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.43ac99aefa80569eea57529cdba046a0/

duty trucks, and medium duty passenger vehicles built in model years 2012 through 2016. If finalized, the proposed rule would surpass the 2007 CAFE standards and require an average fuel economy standard of 35.5 mpg in 2016. On May 22, 2009, the DOT and USEPA issued a notice of upcoming joint rulemaking on this issue.[1092] A Draft Environmental Impact Statement has been issued and the comment period for this ends on November 9, 2009. On June 30, 2009, the USEPA granted the waiver for California for its greenhouse gas emission standards for motor vehicles; this is described in more detail below.

Energy Independence and Security Act of 2007

In addition to setting increased CAFE standards for motor vehicles, the EISA includes other provisions:

- Renewable Fuel Standard (RFS) (Section 202)
- Appliance and Lighting Efficiency Standards (Sections 301–325)
- Building Energy Efficiency (Sections 411–441)

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

State

California Code of Regulations, Title 24

New residential and non-residential buildings in California are required to conform to energy conservation standards specified in Title 24, Part 6 of the *California Code of Regulations* (CCR). Title 24 efficiency standards regulate energy consumed for heating, cooling, ventilation, water heating, and lighting on a per-square-foot basis. Title 24 standards do not regulate plug-in appliances. The standards establish "energy budgets," expressed in terms of energy consumed per year. The energy budget weights energy consumed during peak hours to place emphasis on efficiency during these periods. Title 24 standards are updated on a periodic basis; the 2008 standards were adopted in April 2009 and go into effect in January 2010.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 establishes voluntary standards, that would become mandatory in the 2010 edition of the Code, on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

California Code of Regulations, Title 20

The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608), dated December 2006, were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for

[1092] USEPA, 2009. *News Release: President Obama Announces National Fuel Efficiency Policy,* http://yosemite.epa.gov/opa/admpress.nsf/6fa790d452bcd7f58525750100565efa/451902cb77d4add5852575bb006d3f9b!OpenDocument.

both federally-regulated appliances and non-federally regulated appliances. While these regulations are now often seen as "business as usual," they do exceed the standards imposed by any other state and reduce GHG emissions by reducing energy demand.

Senate Bill 1078

Senate Bill (SB) 1078, adopted by the State Legislature in September 2002, establishes a renewable portfolio standard (RPS) for electricity supply. The RPS requires that retail sellers of electricity provide 20 percent of their supply from renewable sources by 2017. This target date was moved forward in 2006 by SB 107 to require compliance by 2010. In addition, electricity providers subject to the RPS must increase their renewable share by at least 1 percent each year.

Senate Bill 1368

Senate Bill (SB) 1368 prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard applies to electricity generated out-of-state as well as in-state, and to publicly owned as well as investor-owned electric utilities.

Senate Bill 1389

Senate Bill (SB) 1389, the *California Integrated Energy Policy*, was adopted by the State Legislature in August 2002. This bill requires the California Energy Commission (CEC) to prepare an Integrated Energy Policy Report (IEPR) for electricity, natural gas, and transportation fuels. The IEPR contains an analysis of the policies and actions that are necessary to ensure that the state has adequate energy resources—including a range of alternative energy resources—to meet its needs. The IEPR also includes recommendations to reduce energy demand and to improve the state's energy infrastructure.

Assembly Bill 1007

Assembly Bill 1007, (Pavley, Chapter 371, Statutes of 2005) required the CEC to prepare a State plan to increase the use of alternative fuels in California (State Alternative Fuels Plan). The CEC prepared the State Alternatives Fuels Plan in partnership with the California Air Resources Board and in consultation with other State, federal, and local agencies.

The final State Alternatives Fuels Plan, published in December, 2007, would attempt to achieve an 80 percent reduction in greenhouse gas emissions associated with personal transportation, even as California's population increases. Measures proposed that would reduce petroleum fuel use include:

1. Lowering the energy needed for personal transportation by tripling the energy efficiency of on-road vehicles by 2050 through:
   a. Conventional gas, diesel, and flexible fuel vehicles (FFVs) averaging more than 40 miles per gallon (mpg).
   b. Hybrid gas, diesel, and FFVs averaging almost 60 mpg.
   c. All electric and plug-in hybrid electric vehicles (PHEVs) averaging well over 100 mpg (on a greenhouse gas equivalents (GGE) basis) on the electricity cycle.
   d. Fuel cell vehicles (FCVs) averaging over 80 mpg (on a GGE basis).

2. Moderating growth in per capita driving, reducing today's average per capita driving miles by about 5 percent or back to 1990 levels.
3. Changing the energy sources for transportation fuels from the current 96 percent petroleum-based to approximately:
   a. 30 percent from gasoline and diesel from traditional petroleum sources or lower GHG emission fossil fuels such as natural gas.
   b. 30 percent from transportation biofuels.
   c. 40 percent from a mix of electricity and hydrogen.
4. Producing transportation biofuels, electricity, and hydrogen from renewable or very low carbon-emitting technologies that result in, on average, at least 80 percent lower life cycle GHG emissions than conventional fuels.
5. Encouraging more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people.

Executive Order S-03-05

Executive Order S-03-05 mandates that California emit 80 percent fewer greenhouse gases in 2050 than it emitted in 1990. Energy efficiency and reduced VMT would play important roles in achieving this aggressive goal.

Executive Orders S-14-08 and S-21-09

Since 2006, California has had a mandate to increase the use of renewable generation to 20 percent of retail electricity sales by 2010 (refer to description of SB 1078 and SB 107, above). In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which raises California's renewable energy goals to 33 percent by 2020. This enhanced target is intended to help California meet statewide greenhouse gas emission reduction targets (refer to Section III.S). This has been reiterated by California Executive Order S-21-09 which charges CARB by July 31, 2010, to establish a regulation consistent with this 33 percent target by 2020. This is a further increase in RPS over SB 1078 and SB 107.

Local

San Francisco General Plan

The Environmental Protection Element[1093] of the General Plan includes a number of energy objectives and policies:

Objective 13 Enhance the energy efficiency of housing in San Francisco.

Policy 13.4 Encourage the use of energy conserving appliances and lighting systems.

Policy 13.5 Emphasize energy conservation in local government housing assistance programs.

[1093] City and County of San Francisco, Planning Department, *Environmental Protection Element of the General Plan,* adopted July 1997, updated in 2004.

Objective 14 Promote effective energy management practices to maintain the economic vitality of commerce and industry.

Policy 14.1 Increase the energy efficiency of existing commercial and industrial buildings through cost-effective energy management measures.

Policy 14.4 Promote commercial office building design appropriate for local climate conditions.

Policy 14.5 Encourage use of integrated energy systems.

Objective 15 Increase the energy efficiency of transportation and encourage land use patterns and methods of transportation which use less energy.

Policy 15.1 Increase the use of transportation alternatives to the automobile.

Objective 16 Promote the use of renewable energy sources.

Policy 16.1 Develop land use policies that will encourage the use of renewable energy sources.

Policy 16.2 Remove obstacles to energy conservation and renewable energy systems in zoning and building codes.

Policy 16.3 Develop information resources to assist in the use of renewable energy.

Policy 18.1 Promote government and private financing partnerships to carry out local energy programs.

The Air Quality Element of the General Plan[1094] includes one objective pertaining to energy use:

Objective 6 Link the positive effects of energy conservation and waste management to emission reductions.

The Housing Element of the General Plan[1095] includes one objective pertaining to energy use:

Policy 11.10 Include energy efficient features in new residential development and encourage weatherization in existing housing to reduce overall housing costs and the long-range cost of maintenance.

San Francisco Building Code, Green Building Ordinance

In August 2008, Mayor Gavin Newsom signed into law San Francisco's Green Building Ordinance (codified as Chapter 13C of the *San Francisco Building Code*) for newly constructed residential and commercial buildings and renovations to existing buildings. The ordinance specifically requires newly constructed commercial buildings over 5,000 gross square feet (gsf), residential buildings over 75 feet in height, and renovations of buildings over 25,000 gsf to be subject to Leadership in Energy and Environmental Design (LEED®)Gold (or an equivalent standard), which makes San Francisco the City

[1094] City and County of San Francisco, Planning Department, *Air Quality Element of the General Plan*, adopted July 1997, updated in 2000.
[1095] City and County of San Francisco, *Housing Element of the General Plan,* adopted 2000, updated in 2004.

with the most stringent green building requirements in the nation.[1096] Table III.R-6 (Summary of San Francisco Green Building Ordinance) illustrates the requirements of the Green Building Ordinance. LEED® is a voluntary, internationally recognized green building certification procedure developed by the US Green Building Council. It reflects that a building or community was designed and built using standards for energy saving, water efficiency, carbon dioxide emissions, improved environmental quality, and general stewardship of resources and sensitivity to their impacts.

Key sections of Chapter 13C pertaining to energy include Section 1304C.2.1.6, which requires enhanced building energy system commissioning for all mid-sized commercial buildings, and Section 1304C.2.1.7, which requires that permit applicants submit documentation to verify renewable on-site energy or purchase of green energy credits (effective January 2012).

Table III.R-6 Summary of San Francisco Green Building Ordinance

	2008	*2009*	*2010*	*2012 and Beyond*
Commercial >5,000 gsf	LEED® Certified Rating[a]	LEED® Silver Rating	Same as for 2009	LEED® Gold Rating
Residential (4 units or less)	GreenPoint Rated: complete checklist	GreenPoint Rated: 25 points	GreenPoint Rated: 50 points	GreenPoint Rated: 75 points
Residential (5+ units less than 75 sf tall)	GreenPoint Rated: complete checklist	GreenPoint Rated: 25 points	GreenPoint Rated: 50 points	GreenPoint Rated: 75 points
Residential (5+units greater than 75 ft tall)	LEED® Certified Rating OR GreenPoint Rated: 50 points	Same as for 2008	LEED® Certified Rating or GreenPoint Rated: 50 points.	Same as for 2010

SOURCE: Chapter 13 of San Francisco Building Code, Ordinance No. 180-08, added Sept 4, 2008

a. The Green Building Ordinance requirements are based on the LEED® for Commercial Interiors v. 2.0 standards from June 2005, LEED® for Core and Shell v. 2.0 standards from July 2006, LEED® for New Construction v. 2.0 standards from July 2007, and GreenPoint Rated v. 2007 standards from March 2007. References to LEED® standards are from the LEED® for New Construction v. 2.0. Equivalent standards may be used in place of the cited standards if the same performance objectives are met.

GoSolarSF

In 2008, the San Francisco Public Utilities Commission (SFPUC) launched the "GoSolarSF" program to San Francisco's businesses and residents, offering incentives in the form of a rebate program that could pay for approximately half the cost of installation of a solar power system, and more to those qualifying as low-income residents.

The Planning Department and Department of Building Inspection have also developed a streamlining process for Solar Photovoltaic Permits and priority permitting mechanisms for projects pursuing LEED® Gold Certification.

[1096] Although in meeting the green building standards project proponents are allowed to choose from a range of possible credit options, the Green Building Ordinance makes certain LEED® credits mandatory requirements. Refer to Section III.L (Hydrology and Water Quality) and Section III.S (Greenhouse Gas Emissions) for further detail regarding implementation of the Green Building Ordinance.

Other Policies

Citywide alternative transportation planning efforts adopted by the City include the *Better Streets Policy*,[1097] designed to improve streetscape policies throughout the City, the Transit Effectiveness Project,[1098] designed to improve transit service, and the *Bicycle Plan*,[1099] designed to increase bicycle accessibility throughout the City. The *Transit First Policy* (Section 16.102 of the *City Charter*) gives priority to public transit investments over other transportation investments; adopts street capacity and parking policies to discourage increased automobile traffic; and encourages the use of transit, bicycling, and walking rather than use of single-occupancy vehicles. San Francisco's 2004 *Climate Action Plan* commits the City to reducing greenhouse gas emissions by 20 percent below 1990 levels by 2012, and outlines actions, including improving energy efficiency that the City can take to meet this goal. Finally, the City's *Planning Code* reflects smart growth policies, such as requiring electric vehicle refueling stations in city parking garages, bicycle storage facilities for commercial and office buildings, and zoning that is supportive of high density mixed-use infill development.

III.R.4 Impacts

Significance Criteria

The City and Agency have not formally adopted significance standards for impacts related to energy, but generally consider that implementation of the Project would have significant impacts if it were to:

R.a Encourage activities that result in the use of large amounts of fuel or energy, or use such resources in a wasteful manner[1100]

Analytic Method

To determine whether the Project would use large amounts of fuel or energy, this analysis provides a quantitative overview of the energy that would be expected to be consumed during the construction and operation of the Project. The analysis also weighs the Project's energy efficiency features when considering the Project's potential for wasteful energy consumption.

Data from the Climate Change Technical Report (Appendix S)[1101] was used to estimate the total energy use per residential unit for space heating and cooling, domestic hot water systems, lighting, and other energy-consuming components of a typical building envelope. The Applicant has made a preliminary commitment to making all new residential units 15 percent more energy efficient than required under the 2008 Title 24

[1097] City and County of San Francisco, *Better Streets Policy, Ordinance 33-06,* adopted by the San Francisco Board of Supervisors on February 6, 2006.
[1098] City and County of San Francisco, Municipal Transportation Agency, *Transit Effectiveness Project,* website: http://www.sfmta.com/cms/mtep/teprecs.htm, accessed August 31, 2009.
[1099] City and County of San Francisco, Municipal Transportation Agency, *San Francisco Bicycle Plan,* website: http://www.sfmta.com/cms/bproj/bikeplan.htm, accessed August 31, 2009.
[1100] Appendix G of the CEQA Guidelines requires that an EIR include a discussion of the potential energy impacts of a project, with a particular emphasis on avoiding or reducing the inefficient, wasteful, and unnecessary consumption of energy. The criteria provided for this analysis adequately cites the requirements of CEQA.
[1101] Modified from the CEC's *Statewide Residential Appliance Saturation Survey, Volume 2, Study Results, Final Report, June, 2004.*

standards as a project design feature by employing high performance glazing, efficient lighting, daylighting, natural ventilation, shading, envelope optimization, reflective roofs, insulation, radiant water heaters, design and installation of HVAC systems to ACCA Manual recommendations, building commissioning, and other energy efficiency measures. The Project energy use factors were adjusted to reflect the Project Applicant's commitment to reduce energy consumption below 2008 Title 24 standards and were used to estimate the energy that would be used by building envelopes, which are governed by Title 24. The energy consumption by non-residential uses (except for the proposed 49ers stadium) was estimated based on data from the Climate Change Technical Report (Appendix S).[1102]

Title 24-regulated energy use (cooling, space heating, water heating, lighting, ventilation) and plug-in energy use (appliances, office equipment, plug-in cooking equipment, electronics, and other plug-in loads) are presented in separate tables. Plug-in energy demand is not governed under Title 24 standards. Plug-in energy use is largely beyond the control of the Project Applicant, as most plug-in equipment would be installed by future occupants rather than by the Applicant. However, the Project Applicant has made a preliminary commitment to install ENERGY STAR[1103] appliances in newly built residences (for builder-supplied appliances) as an energy-saving measure. Because it is not clear which appliances would be chosen, the decrease in plug-in electricity use associated with ENERGY STAR appliances cannot be quantified at this time. Plug-in energy use is discussed qualitatively.

The *San Francisco Climate Action Plan* contains an estimate of the existing stadium's energy use. The stadium's existing electricity use is 5,100 MWh per year, and natural gas use is 9,000 MBtu per year.[1104] The new stadium would be more energy efficient than the old stadium, which was built in 1960. Based on estimates from other new football stadiums, the new stadium would use approximately 20 percent less electricity than the existing stadium.[1105] Thus, the energy use projections presented in the analysis below include a 20 percent reduction for stadium energy use.

Projected petroleum fuel use associated with Project vehicle trips was estimated by multiplying the Project vehicle miles traveled (VMT) from the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*[1106] by Caltrans average fuel efficiencies for San Francisco.[1107] The analysis considers the Project's transportation demand management (TDM) programs and programs designed to shift trips to other modes of transportation in the analysis of the Project's overall energy efficiency.

Additionally, the Project's potential contribution to cumulative energy impacts is evaluated.

[1102] Modified from CEC, *California Commercial End-Use Survey*, website: http://www.energy.ca.gov/ceus/, accessed August 30, 2009.
[1103] The term ENERGY STAR is capitalized as is the convention used by the United States Environmental Protection Agency and Department of Energy.
[1104] City and County of San Francisco, Department of the Environment and Public Utilities Commission, *Climate Action Plan for San Francisco.*
[1105] The new stadium to be used by the New York Jets and Giants is expected to reduce energy consumption by 30 percent as compared to their old stadium. The new stadium to be used by the Dallas Cowboys is expected to reduce energy use by 20 percent as compared to their old stadium.
[1106] CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Bayview Waterfront Project Transportation Study,* 2009.
[1107] California Department of Transportation, *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009.

Construction Impacts

Impact ME-1: Energy Use during Construction

Impact ME-1 **Construction activities associated with the Project would not result in the use of large amounts of energy, or use energy in a wasteful manner. (Less than Significant)** ***[Criterion R.a]***

Construction activities associated with the Project would require the following sources of energy:

- Electricity, for operation of hand tools, air compressors, mobile project offices, and security lighting
- Diesel, for grading and construction equipment, delivery trucks, and earth hauling trucks
- Gasoline, to fuel construction worker commute vehicles

Although natural gas is sometimes used as a construction fuel to minimize localized air quality impacts, the construction activities for this Project would not exceed health standards, and thus, would not require substitution of natural gas fuels for standard diesel fuels. Air quality parameters would be met using a phased-in diesel exhaust retrofit program for construction equipment, described in the Project Health Risk Assessment (Appendix H1 [Ambient Air Quality and Human Health Risk Assessment]).[1108] All lifts would be either propane or electrically powered.

The construction activities for the Project would not be expected to result in demand for fuel greater than any other similarly sized project in the region. Although the Project would be large, it would be constructed over a period of approximately 29 years and demand for electricity and fuels would be spread out over this timeframe. The Project has been broken down into construction phases; each of these phases is comparable to similar projects in terms of: activity types, duration, land use, development area, and fuel consumption.

Given these considerations, the construction-related energy use associated with the Project would not be large or wasteful and is considered less than significant. No mitigation is required.

Operational Impacts

Impact ME-2: Electricity Use in Large Amounts or a Wasteful Manner

Impact ME-2 **Buildings constructed by the Project would not use large amounts of electricity in a wasteful manner. (Less than Significant with Mitigation)** ***[Criterion R.a]***

Table III.R-7 (Project Electricity Demand from Plug-In Appliances [MWh]) presents the estimated Project electricity use for plug-in appliances. The Project would require approximately 59,616 MWh of electricity annually to supply plug-in appliances. Because plug-in electricity use depends on the appliances installed by future Project residents and employees, plug-in consumption would be difficult for the Project Applicant to influence. However, the Project Applicant's preliminary commitment to installing ENERGY

[1108] ENVIRON, 2009. *Ambient Air Quality Human Health Risk Assessment: Candlestick Point-Hunters Point Shipyard Phase II Development Plan.* The Health Risk Assessment analysis assumes that 50 percent of the construction equipment used would be retrofitted with after-market filters in 2010 and 2011, 75 percent would be retrofitted in 2012, and 100 percent would be retrofitted in 2013. Section III.H (Air Quality) indicates that air emissions from construction equipment would result in a less than significant impact.

STAR appliances into residential units for all builder-supplied appliances would result in a small decrease in plug-in energy use below the numbers shown.

Table III.R-7 Project Electricity Demand from Plug-In Appliances (MWh)

Type of Use	Energy Use Factor (MWh/gsf or unit)[a]	Candlestick Point		HPS Phase II		Project Site Total		Percent of Total by Land Use
		Development Program[b]	MWh Consumed Annually[c]	Development Program[b]	MWh Consumed Annually[c]	Development Program	MWh Consumed Annually	
Residential Units	1.7830[d]	7,850	13,997	2,650	4,725	10,500	18,722	31%
Retail	0.0096	635,000	6,077	—	—	635,000	6,077	10%
Neighborhood Retail	0.0096	125,000	1,196	125,000	1,196	250,000	2,392	4%
Office	0.0093	150,000	1,388	—	—	150,000	1,388	2%
R&D	0.0093	—	—	2,500,000	23,125	2,500,000	23,125	39%
Hotel	0.0069	220	2	—	—	220	2	0%
Artist Studios/ Center	0.0093	—	—	255,000	2,359	255,000	2,359	4%
Community Space	0.0093	50,000	463	50,000	463	100,000	926	2%
Arena	0.0073	75,000	548	—	—	75,000	548	1%
Stadium[e]	N/A	—	—	1,860,000	4,080	1,860,000	4,080	7%
Total			***23,671***		***35,948***		***59,619***	***100%***
Percent of Total			***40%***		***60%***			

SOURCES:

Baseline Project natural gas demand was estimated based on land use and basic compliance with 2008 Title 24 standards.

a. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

b. Based on buildout floor areas provided in Table II-2 (Existing and Proposed Uses) of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The electricity factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor is in the "Plug-in" column and the "Minimally Title 24 Compliant (2008)" row. The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

e. Electricity use for the Candlestick Park stadium was estimated in: City and County of San Francisco, 2004. *Climate Action Plan,* Table 2-4. Based on comparable energy savings achieved by other recently constructed stadiums, a 20 percent reduction in electricity use is anticipated with construction of the replacement stadium.

Table III.R-8 (Project Electricity Demand from Building Envelopes [MWh]) presents the projected electricity demand of the Project associated with building envelope design. The projected demand incorporates energy savings associated with the Applicant's preliminary commitment to planning, designing, and constructing the Project to reduce energy use to 15 percent below 2008 Title 24 standards. As shown, the electricity demand associated with Project building envelopes would be approximately 34,974 MWh. A similarly sized project that would not include the electricity reduction below 2008 Title 24 standards would result in consumption of approximately 40,426 MWh of electricity use annually.[1109]

[1109] Electricity use for the stadium is not governed under Title 24, thus, reductions in electricity use associated with the stadium are factored into both the Title 24 and 15 percent reduction scenarios presented in Table III.R-8.

Table III.R-8 Project Electricity Demand from Building Envelopes (MWh)

		Candlestick Point			*HPS Phase II*			*Project Site Total*			
Type of Use	*Electricity Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]*	*Development Program[b]*	*MWh Consumed Annually, 2008 Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program[b]*	*MWh Consumed Annually, Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program*	*MWh Consumed Annually, Title 24 Standards*	*MWh Consumed Annually, with 15% Reduction*	*Percent of Total Electricity by Land Use*
Residential Units	1.7350[d]	7,850	13,620	11,577	2,650	4,598	3,908	10,500	18,218	15,485	45%
Retail	0.0027	635,000	1,715	1,457	—	0	0	635,000	1,715	1,457	4%
Neighborhood Retail	0.0027	125,000	338	287	125,000	338	287	250,000	676	574	2%
Office	0.0052	150,000	780	663	—	0	0	150,000	780	663	2%
R&D	0.0052	—	0	0	2,500,000	13,000	11,050	2,500,000	13,000	11,050	32%
Hotel	0.0027	220	1	1	—	0	0	220	1	1	0%
Artist Studios/ Center	0.0052	—	0	0	255,000	1,326	1,127	255,000	1,326	1,127	3%
Community Space	0.0052	50,000	260	221	50,000	260	221	100,000	520	442	1%
Arena	0.0015	75,000	113	96	—	0	0	75,000	113	96	0%
Stadium[e]	N/A	—	0	0	1,860,000	4,080	4,080	1,860,000	4,080	4,080	10%
Total			***16,827***	***14,302***		***23,602***	***20,673***		***40,429***	***34,975***	***100%***

SOURCES:

Project electricity demand was estimated based on the Applicant's commitment to achieve 15 percent energy reductions below Title 24 standards and use ENERGY STAR appliances in all residential units.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor was derived by subtracting the "Plug-in" factor from the "Electricity Delivered, Total" column (in the "15% Better than Title 24 2008 and ENERGY STAR Appliances" row). The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. Based on buildout floor areas provided in Table II-2 (Existing and Proposed Uses) of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

e. Electricity use for the Candlestick Park stadium was estimated in: City and County of San Francisco, 2004. *Climate Action Plan,* Table 2-4. Based on comparable energy savings achieved by other recently constructed stadiums, a 20 percent reduction in electricity use is anticipated with construction of the replacement stadium.

The combined annual electricity use of the Project, including both building envelope consumption and plug-in electricity use would be 94,590 MWh,[1110] not taking into account reductions associated with the use of ENERGY STAR appliances or green building measures beyond the Project Applicant's preliminary commitment to reduce energy use 15 percent below 2008 Title 24 standards.

The threshold for this impact considers whether the Project would result in a large increase in electricity consumption. The electricity use at the Project site, following implementation of energy efficiency measures, would represent approximately 1.8 percent of the City's total electricity consumption of 5,155 million kWh, and would result in approximately ten times the existing electricity use of 9,457 MWh at the Project site. This would be a large overall increase in consumption because much of the Project site is unoccupied and undeveloped; however, on a per-square-foot basis, the Project would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

In addition, the Project would be required to comply with the City's Green Building Ordinance. The Green Building Ordinance requires newly constructed commercial buildings over 5,000 gsf, residential buildings over 75 feet in height, and renovations on buildings over 25,000 gsf to meet LEED® or other green building standards. Individual buildings would incorporate various green building specifications to meet the Green Building Ordinance and, in some cases, seek LEED® certification, or an equivalent certification for these buildings. While specific green building measure cannot be identified until building designs have been completed, examples of measures that could be implemented by the Project in compliance with the Green Building Ordinance include high performance glazing, shading, envelope optimization, reflective roofs, and natural ventilation (reducing energy use for heating and cooling), natural and energy efficiency lighting (reducing energy for artificial lighting), reduced water consumption (reducing energy use associated with the conveyance of water and wastewater), and energy commissioning, a process that requires verification, monitoring, and regular maintenance of energy systems to achieve peak performance.

The Project Applicant has also made a preliminary commitment to voluntarily implement LEED® for Neighborhood Development (LEED® ND) standards based on the Pilot Version of the rating system released in June 2007.[1111] While most LEED® standards apply to individual structures, the new LEED® ND standards apply principles of smart growth, urbanism, and green building into a certification system for overall neighborhood design. LEED® ND was designed through collaboration between the USGBC, the Congress for the New Urbanism, and the Natural Resources Defense Council and would provide independent, third-party verification that the development's location and design meet accepted high levels of environmentally responsible, sustainable development. A preliminary analysis indicates the Project could achieve approximately 63 LEED® ND credits, which would make the Project eligible for Gold certification under LEED® ND 2007.[1112,1113] Points would be achieved through strategies including, but not limited to, the following:

[1110] Plug-in energy use (59,616 MWh) + building envelope energy use (34,974 MWh) = 94,590.

[1111] Since the initial release of the ND standard, the rating system has undergone two public comment periods, and several credit requirements have changed. The LEED® ND rating system is currently being finalized for formal release by the USGBC.

[1112] These numbers are preliminary estimates by ARUP, 2009. The Project Applicant has not yet committed to seeking certification under the modified standards.

[1113] LEED® certification is obtained by demonstrating compliance with a number of design and construction credits. For example, a project that receives 60 to 79 credits receives Gold certification. The Applicant would design and

- Compact, infill development (including 90 percent of the new buildings fronting on public streets or open space)
- Enhanced habitat values
- Brownfield remediation and urban reuse
- Close proximity to transit and bicycle networks (75 percent of all development would be within ¼ mile walk to a transit stops, and Class I, II, and III bikeways would provide connections throughout the site and to the greater Bayview community)
- Urban design that promotes walking and discourages driving
- Diversity of land uses and housing types
- Affordable housing that supports a community of mixed ages and income
- Community participation in community planning and design
- ENERGY STAR compliance to be documented by a Home Energy Rating System (HERS)
- Drought tolerant plant species and the use of efficient irrigation systems such as drip irrigation, moisture sensors, and weather data-based controllers
- Tree-lined streets throughout the development and streetscape improvements extending from the Project Site to Third Avenue along Gilman and Palou
- Access to public space and recreational amenities through the creation of parks and playfields
- Efficient use of water and the potential use of recycled water for non-potable water uses such as irrigation, toilets, vehicle washing
- Stormwater management practices that would retain and treat stormwater on site and/or in adjacent areas

Although additional energy savings associated with implementation of the City's Green Building Ordinance and the LEED® ND standards cannot be modeled until designs have been completed, these measures could further decrease the energy consumption presented in Table III.R-8.

To reduce peak demand on existing electricity infrastructure and to further State and local renewable energy policies, the Applicant would implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity; the use of solar thermal energy to provide space cooling with the use of absorption systems; and/or water for space heating and domestic water systems. The specifics of the Project's renewable energy programs have not yet been developed.

Taking the Project's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as well as the level of development proposed, the electricity increase associated with the Project would not be considered large.

The City's threshold also considers whether the Project's energy consumption would be wasteful. The efficiency measures proposed under the Project would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the Project's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the Project's voluntary implementation of LEED® ND standards. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and

develop buildings to comply with the Green Building Ordinance, and, meet LEED® or equivalent requirements; however, the Applicant may choose not to seek and obtain LEED® certification for every building developed.

not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and mitigation measure MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less than significant.

Impact ME-3: Natural Gas Use in Large Amounts or a Wasteful Manner

Impact ME-3 **Buildings constructed by the Project would not use large amounts of natural gas in a wasteful manner. (Less than Significant with Mitigation) *[Criterion R.a]***

Table III.R-9 (Project Natural Gas Demand, Baseline [MBtu]) presents the annual natural gas use for the Project, estimate based on land use and minimal compliance with Title 24 standards as well as the Project Applicant's preliminary commitment to reduce energy use to 15 percent below Title 24 standards. The natural gas demand associated with the Project would be approximately 63,263 MBtu, in comparison to a similarly sized project that would not include the 15 percent reduction below 2008 Title 24 standards and which would result in consumption of approximately 73,156 MBtu of natural gas use annually.[1114]

The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be over four times higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly three and a half times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the Project would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

As described under Impact ME-2, the Project would be required to comply with the City's Green Building Ordinance and has voluntarily committed to constructing the Project to the LEED® ND Gold standard based on the Pilot Version of the rating system released in June 2007.[1115] Although energy savings associated with these programs could vary based on the credits chosen and, therefore, cannot be accurately quantified, additional energy savings, beyond those shown in Table III.R-9, are anticipated.[1116]

[1114] Electricity use for the stadium is not governed under Title 24, thus, reductions in electricity use associated with the stadium are factored into both the Title 24 and 15 percent reduction scenarios presented in Table III.R-8.
[1115] Since the initial release of this standard, the rating system has undergone two public comment periods, and several credit requirements have changed. The LEED® ND rating system is currently being finalized for formal release by the USGBC.
[1116] LEED® certification is obtained by demonstrating compliance with a number of design and construction credits. For example, a project that receives 60 to 79 credits receives Gold certification. The Applicant would design and develop buildings to comply with the S.F. Green Building Ordinance, and, meet LEED or equivalent requirements; however, the Applicant may choose not to seek and obtain LEED certification for every building developed.

Table III.R-9 Project Natural Gas Demand, Baseline (MBtu)

		Candlestick Point			HPS Phase II			Project Site Total			
Type of Use	*Natural Gas Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)*[a]	*Development Program*[b]	*MBtu Consumed Annually, 2008 Title 24 Standards*[c]	*MBtu Consumed Annually, with 15% Reduction*	*Development Program*[b]	*MBtu Consumed Annually, 2008 Title 24 Standards*[c]	*MBtu Consumed Annually, with 15% Reduction*	*Development Program*	*MBtu Consumed Annually, 2008 Title 24 Standards*[c]	*MBtu Consumed Annually, with 15% Reduction*	*Percent of Total by Land Use*
Residential Units	0.0360[d]	7,850	283	240	2,650	95	81	10,500	378	321	1%
Retail	0.0048	635,000	3,048	2,591	—	—	—	635,000	3,048	2,591	4%
Neighborhood Retail	0.0048	125,000	600	510	125,000	600	510	250,000	1,200	1,020	2%
Office	0.0200	150,000	3,000	2,550	—	—	—	150,000	3,000	2,550	4%
R&D	0.0200	—	—	—	2,500,000	50,000	42,500	2,500,000	50,000	42,500	68%
Hotel	0.0345	220	8	6	—	—	—	220	8	6	0%
Artist Studios/ Center	0.0200	—	—	—	225,000	4,500	3,825	225,000	4,500	3,825	7%
Community Space	0.0200	50,000	1,000	850	50,000	1,000	850	100,000	2,000	1,700	3%
Arena	0.0243	75,000	1,823	1,549	—	—	—	75,000	1,823	1,549	2%
Stadium[e]	N/A	—	—	—	1,860,000	7,200	7,200	1,860,000	7,200	7,200	10%
Total			***9,762***	***8,296***		***63,395***	***54,966***		***73,157***	***63,262***	***100%***
Percent of Total			***13%***			***87%***			***100%***		

SOURCES:

Baseline Project natural gas demand was estimated based on land use and basic compliance with 2008 Title 24 standards.

a. The natural gas factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Overall Based on 2008 Title 24" column. The factors were converted from kBtu to MBtu.

b. Based on buildout floor areas provided in Table II-2 (Existing and Proposed Uses) of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The natural gas factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor is in the "Natural Gas Delivered, Total" column and the "Minimally Title 24 Compliant (2008)" row. The factor was converted from kBtu to MBtu (1 MBtu = 1,000 kBtu).

e. Natural gas use for the Candlestick Park stadium was estimated in: City and County of San Francisco, 2004. *Climate Action Plan,* Table 2-4. Based on comparable energy savings achieved by other recently constructed stadiums, a 20 percent reduction in natural gas use is anticipated with construction of the replacement stadium.

However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

Impact ME-4: Vehicle-Trip Energy Use in Large Amounts or a Wasteful Manner

Impact ME-4 **Vehicle trips associated with the Project would not use large amounts of energy in a wasteful manner. (Less than Significant with Mitigation) *[Criterion R.a]***

The Project would increase trips to and from the Project site, increasing the use of petroleum fuels. Based on average fuel efficiencies for the City of San Francisco and the Project VMT (reported in the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*), the Project would result in a demand for 14.01 million gallons of gasoline and 0.93 million gallons of diesel annually (refer to Table III.R-11 [Project Petroleum Demand]).

Table III.R-11 Project Petroleum Demand

	Project Annual VMT (million miles travelled)[a]	*Average Countywide Vehicle Fuel Efficiency (2030)*[b]	*Project Total Fuel Consumption (million gallons)*	*Project Gasoline Consumption (million gallons)*[c]	*Project Diesel Consumption (million gallons)*[c]
Candlestick Point	223.67	21.15	10.58	9.92	0.66
Hunters Point Shipyard	92.36	21.15	4.37	4.09	0.27
Total	***316.03***		***14.95***	***14.01***	***0.93***

SOURCES:

a. Annual VMT was calculated by PBS&J based on trip generation information and average trip lengths reported in: CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study,* 2009.

b. Equals the projected 2030 VMT (3,495 million miles travelled) divided by the projected total transportation fuel consumed (171.27 million gallons) for San Francisco County, as reported in: California Department of Transportation (Caltrans), *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009. This factor does not take into account recently adopted fuel efficiency standards.

c. On average 94 percent of the transportation fuels consumed in San Francisco were gasoline fuels, while 6 percent were diesel fuels, as reported in: California Department of Transportation (Caltrans), *California Motor Vehicle Stock, Travel and Fuel Forecast*, website: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff08.pdf, accessed August 20, 2009.

The use of fuels resulting from Project-related travel to and from the Project site would be five times higher than under existing conditions, a large increase in consumption. However, this consumption would not be wasteful because (1) the Project proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements that would encourage alternative travel modes; (2) the Project would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips; and (3) the Project would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. Project design features and programs that would increase the efficiency of transportation activities associated with the Project are described in Section III.D (Transportation and Circulation) and summarized below.

Transit Improvements: The Project proposes to implement the following transit improvements (described in Section III.D):

- Extended existing Muni Service and increased frequency
- Harney/Geneva BRT/Transit Preferential Street
- Hunters Point Transit Center
- Bus Rapid Transit Stops
- Palou Avenue Transit Preferential Street

Bicycle Network Improvements: Currently, the Project site has little in the way of existing bicycle amenities and trail connections. The Project would include the construction of the Bay Trail throughout the Project site, including connections to the existing and new parks from the western boundary of Candlestick Point near the Harney Way/US-101 interchange, through the Candlestick Point State Recreation Area (CPSRA), Yosemite Slough, and HPS Phase II shoreline to India Basin. The Bay Trail would be incorporated into the Yosemite Slough bridge, which would serve bus transit and pedestrian and bicycle routes between Candlestick Point and HPS Phase II. Bikeways would provide connections within the Project site and to the surrounding neighborhoods and other parts of the City. Bicycle lanes would be provided along major roadways, consistent with City guidelines, and it is anticipated that as the street network develops, the bicycle facilities would be incorporated into the City's official bicycle route network. There would be bicycle parking in each commercial parking facility and residential garages. New commercial buildings with at least 20,000 gsf of floor area, as well as other facilities and attractions would provide locker and shower facilities.

Pedestrian Network Improvements: The Project proposes to enhance the pedestrian network at the Project site. The pedestrian network would encourage walking as a primary mode of transportation at the Project site. Pedestrian facilities, including sidewalk and multi-use pathways, would allow access to transit facilities and to shopping, schools, and recreation. The interior roadway network would include traffic calming features to facilitate safe pedestrian travel. The streets would be designed to accommodate multi-modal travel with features including curb extensions, intersection bulb-outs, raised crosswalks, comprehensive signage, street trees, narrow roadway lanes, and short blocks and other features to slow auto traffic. All pedestrian facilities would meet ADA standards.

Transportation Demand Management (TDM) Programs: The Project TDM programs would be designed to reduce use of single-occupant vehicles and to increase the use of rideshare, transit, bicycle and walk modes for trips to and from, as well as within the Project. In addition, the TDM plan would include measures to reduce the demand for travel during peak times. The TDM plan would include the following strategies (described in Section III.D):

- Transportation Coordinator and Website
- Employee TDM Programs
- Carpool/Vanpools
- Carshare Services
- Transit Passes
- Outreach

- Unbundled Residential Parking
- Parking Fees
- Dedicated Bicycle and Bus Lanes

Finally, the Project would be an infill project within a developed urban area that would provide access to employment, retail, and recreational opportunities. The VMT for the Project anticipates shorter and fewer trips as a result of the proposed density and mixed uses at the Project site.

As a result of these Project features and programs, between 28 and 34 percent of the weekday AM and PM peak hour person trips would be internal pedestrian trips within the Project site, according to the Transportation Study (Appendix D).[1117] Of the remaining external trips, 21 percent would be conducted via transit and 3 percent would be conducted via bicycle.[1118] The shift to non-vehicular modes of travel would result in savings in transportation fuels. Over time, implementation of the State Alternatives Fuels Plan (see Regulatory Framework) is expected to increase the efficiency of vehicle trips, result in the development of alternative fuels, and shift trips to non-vehicular modes of travel. Project programs, in combination with local and State policies, would minimize vehicular fuel use.

In summary, the programs proposed under the Project for minimization of trips, as well as the Project's density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. However, in an abundance of caution and because Project site plans are in a preliminary state, mitigation measures MM TR-1 through MM TR-5, requiring implementation of specified circulation improvements that would minimize VMT, are applied to the Project. Following implementation of these mitigation measures, impacts would be considered less than significant.

Cumulative Impacts

The geographic context for evaluation of cumulative energy impacts is the Bayview Hunters Point neighborhood. The past and present development is described in the Setting section of this chapter, representing the baseline conditions for evaluation of cumulative impacts. Reasonably foreseeable future development includes Executive Park, Jamestown, Hunters Point Shipyard Phase I, Hunters View, and India Basin Shoreline. These areas contain a mixture of land uses, including residential, commercial, and industrial uses. The past and present development in these areas is described in Section III.B. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects going through the entitlement process.

All development anticipated under the cumulative scenario, including the Project, would be expected to comply with the energy efficiency standards in Title 24, and, for those projects exceeding certain size thresholds, the City's Green Building Ordinance. In accordance with these requirements, all proposed developments would use site and building design strategies similar to those employed by the Project to discourage wasteful energy consumption. While it is not certain that other developments would commit to

[1117] CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*, 2009.
[1118] CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*, 2009.

the 15 percent reduction in energy consumption (below Title 24 standards) that is proposed under the Project, the cumulative demand for electricity and natural gas would be reduced through implementation of the City's *Building Code* policies and incentives. Electricity and natural gas consumption would therefore be less than significant.

Petroleum consumption associated with the new development identified above would be primarily attributable to transportation, especially private automobile use. However, the cumulative study area is an urban area, with a range of alternative transportation options. As development in the cumulative study area occurs, the development pattern over time, allowing greater walkability. Increased population density and mixed-use development would allow residents to work, shop, and live within a small area, reducing average trip lengths, which would in turn result in lower consumption of fuels. Pedestrian and bicycle amenities would be enhanced in the cumulative study area as a result of City programs, contributing to a reduction in vehicular travel. These considerations would reduce wasteful petroleum consumption associated with unnecessary automobile trips and long commutes. State fuel efficiency standards and alternative fuels policies contained in the State Alternatives Fuels Plan (see Regulatory Framework) would also contribute to a reduction in fuel use.

For all of these reasons, the cumulative construction and operational impact with regard to the consumption of energy resources would be less than significant.

SECTION III.S GREENHOUSE GAS EMISSIONS

III.S.1 Introduction

It is widely recognized that emissions of greenhouse gases[1119] (GHG) associated with human activities are contributing to changes in the global climate, and that such changes are having and would have adverse effects on the environment, the economy, and public health. These changes are the cumulative effects of past, present, and future actions worldwide. While worldwide contributions of greenhouse gases are expected to have widespread consequences, in general, currently it is not possible to correlate specific greenhouse gas emissions from a particular source or location with a climate change or associated environmental impacts of climate change at another location in California or the world. It is possible to quantify the greenhouse gases that would be emitted either directly from Project sources or indirectly from other sources, such as production of electricity used at the Project. However, those emissions cannot be tied to a particular adverse climate change effect on the environment.

During build-out and operation of the Project, greenhouse gases would be emitted as the result of construction activities; changes in vegetation sequestration capacity; new direct operational sources, such as natural gas usage; and indirect operational sources, such as production of electricity used at the Project, transport of water, and decomposition of Project-related wastes. Greenhouse gases would also be emitted by residents, visitors, and employees travelling to and from the Project site. This environmental impact report (EIR) estimates the Project's greenhouse gas emissions and discusses the Project's contribution to worldwide emissions of greenhouse gases.

The State of California, through the *California Global Warming Solutions Act of 2006*, Assembly Bill (AB) 32, and Executive Order S-3-05, has set statewide targets for the reduction of greenhouse gas emissions (refer to the Section III.S.3 [Regulatory Framework]). "The goal of AB 32 and S-3-05 is the significant reduction of future greenhouse gas emissions in a state that is expected to rapidly grow in both population and economic output."[1120] Accordingly, to achieve the state's goals, there would have to be a significant reduction in per capita greenhouse gas emissions.

For this EIR, emissions from nine categories of direct and indirect GHG emissions are estimated: emissions due to changes in vegetation sequestration, emissions from construction activities, residential building emissions, non-residential building emissions, mobile source emissions, municipal emissions, area sources, solid waste, and transit services. All emissions inventories are presented in metric tons unless otherwise indicated. An analysis of the life-cycle emissions associated with building materials was also prepared but not considered in the main emissions inventory.

The emissions inventory presented in this report was developed using guidance from two government-sponsored organizations to assist in the estimation of GHG emissions. These are the methodologies established by the California Climate Action Registry (CCAR) or the Intergovernmental Panel on Climate

[1119] For the purposes of this analysis, the term "greenhouse gases" refers to carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, those gases regulated under the California Global Warming Solutions Act of 2006 (Assembly Bill 32).
[1120] CAPCOA, 2008. *CEQA and Climate Change*, p. 32.

Change (IPCC), where possible. A variety of methods are employed to develop a complete emissions inventory including using studies commissioned by the California Energy Commission (CEC) providing data on energy use patterns associated with municipal activities, natural resource distribution, and other activities that would take place at the Project. In addition to CEC studies, studies performed by individual municipalities or scientific organizations are also used. Several publically available models and software programs developed by California agencies were used to assist in calculation of emissions. These include OFFROAD 2007, EMFAC2007, and Urban Emissions Model (URBEMIS). Sources used for this section include *Climate Change Technical Report for the Candlestick Point–Hunters Point Shipyard Phase II Project* (Environ 2009), included as Appendix S (Climate Change Technical Report), and information from the City and County of San Francisco Climate Action Plan (SFCAP), California Air Resources Board (ARB), and the California Climate Action Team (CAT).

III.S.2 Setting

Overview of Climate Change

Global climate change is a broad term used to describe any worldwide, long-term change in the earth's climate. This change could be, for example, an increase or decrease in temperatures, the start or end of an ice age, or a shift in precipitation patterns. The term global warming is a more specific type of global climate change and refers to a general increase in temperatures across the earth. These rising temperatures can cause other climatic changes, such as a shift in the frequency and intensity of rainfall or hurricanes. Global warming does not necessarily imply that all locations would be warmer. Some specific, unique locations may be cooler even though the world, on average, is warmer.

Some gases in the atmosphere affect the Earth's heat balance through the greenhouse effect by absorbing infrared radiation. This layer of gases in the atmosphere prevents the heat from escaping. These gases are known as greenhouse gases. Naturally occurring GHGs have been present at relatively stable levels in the atmosphere for millennia. Examples of these natural GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapor. In addition to these natural GHGs, there are several other man-made GHGs, including but not limited to: sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.

As human industrial activity increased, the concentrations of GHGs in the atmosphere have increased. There is a general scientific consensus that most current global warming is the result of human activity on the planet. It is widely accepted that continued increases in GHG emissions would contribute to global climate change although there is uncertainty concerning the magnitude and timing of future emissions and the resultant warming trend. Human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors contribute to these GHG emissions. The ARB reported that transportation was the largest sector contributing to GHG emissions at 38 percent of the state's 2004 GHG emissions, followed by electricity generation.[1121]

The effect that each of these gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). As shown in Table III.S-1 (Global Warming

[1121] California Air Resources Board. 2007. *Staff Report – California 1990 Greenhouse Gas Emissions Level and 2020 Emission Limit*, November 16. http://www.arb.ca.gov/cc/ccei.htm.

Potentials of Select Greenhouse Gases), GWP indicates, on a pound for pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent GHGs than CO_2, with GWPs of 21 and 310, respectively.[1122] The GWP of a specific GHG depends on the absorption of infrared radiation by a GHG, the spectral location of its absorbing wavelengths, and the atmospheric lifetime of the GHG. In emissions inventories, GHG emissions are typically reported in terms of pounds (lbs) or tonnes[1123] of CO_2 equivalents (CO_2e). CO_2e are calculated as the sum of the product of the mass emitted of all six GHG and the GHG's specific GWP. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e, both from residential developments and human activity in general (ENVIRON, p. 1).

Table III.S-1 Global Warming Potentials of Select Greenhouse Gases

Gas	*Global Warming Potential (100 year time horizon)*
Carbon Dioxide	1
Methane	21
Nitrous Oxide	310
HFC-23	11,700
HFC-134a	1,300
HFC-152a	140
PFC: Tetrafluoromethane (CF_4)	6,500
PFC: Hexafluoroethane (C_2F_6)	9,200
Sulfur Hexafluoride (SF_6)	23,900

SOURCE: California Climate Action Registry. 2009. General Reporting Protocol Version 3.1. January

Water vapor is an important GHG, but is not recognized by international conventions because there is not an obvious correlation between water concentrations and specific human activities. Water vapor concentrations appear to act in a positive feedback manner; higher temperatures lead to higher water vapor concentrations.[1124]

Each of the six GHGs that are regulated by the Kyoto accords and the State of California[1125] are discussed below:

[1122] GWP values from IPCC's Second Assessment Report (SAR, 1996) are still used by international convention and are used in this protocol, even though more recent (and slightly different) GWP values were developed in the IPCC's Third Assessment Report (TAR, 2001).
[1123] In this report, "tonnes" would be used to refer to metric tonnes (1,000 kilograms). "Tons" would be used to refer to short tons (2,000 pounds).
[1124] IPCC. Third Assessment Report.
[1125] Governor Schwarzenegger recently added nitrogen trifluoride to the list regulated by the state of California. Nitrogen trifluoride is used primarily in the microelectronics industry.

Carbon dioxide (CO_2) is an odorless, colorless gas, which has both natural and anthropogenic (arising from human activities) sources. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 parts per million (ppm) in 2005, which equates to an increase of 1.4 ppm per year since 1960.[1126] CO_2 is the most common greenhouse gas generated by California activities, constituting approximately 84 percent of all greenhouse gas emissions.[1127] CO_2 emissions attributed to California activities are mainly associated with in-state fossil fuel combustion and fossil fuel combustion in out-of-state power plants supplying electricity to California. Other activities that produce CO_2 emissions include mineral production, waste combustion, and land use changes that reduce vegetation.

Methane (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. A natural source of methane is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are landfills, fermentation of manure, and cattle.

Nitrous oxide (N_2O), also known as laughing gas, is produced naturally by microbial processes in soil and water. Anthropogenic sources of nitrous oxide include agricultural sources, industrial processing, fossil fuel-fired power plants, and vehicle emissions. Nitrous oxide also is used as an aerosol spray propellant and in medical applications.

Other gases that contribute to the greenhouse effect include ozone,[1128] chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and aerosols. However, these latter greenhouse gases are generally emitted during industrial processes that are not expected at the Candlestick Point–Hunters Point Shipyard Phase II Redevelopment. This analysis, therefore, considers those GHGs most likely to be emitted by the Project: carbon dioxide, nitrous oxide, and methane.

Candlestick Point–Hunters Point Shipyard Phase II Redevelopment Plan residents, employees, and patrons of commercial and municipal buildings use electricity, heat their homes and water, and are transported in motor vehicles, all of which directly or indirectly emit GHGs. The principal GHGs emissions resulting from such developments are CO_2, CH_4, and N_2O. CO_2 is considered the most important GHG, due primarily to the large emissions produced by fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles. CH_4 and N_2O are also emitted by fossil fuel combustion, though their emissions are much less significant than CO_2. CH_4 is also emitted from the transmission, storage, and incomplete combustion of natural gas (ENVIRON, p. 1) and landfills.

[1126] IPCC, 2007. R.B. Alley et al. *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Summary for Policymakers.

[1127] CEC, 2007. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004*.

[1128] Ozone is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change. California Environmental Protection Agency, 2004. Technical Support Document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles Climate Change Overview.

Scientific Assessment of Climate Change Scenarios

As GHG emissions increase, temperatures in California are projected to rise over the twenty-first century. The modeled magnitudes of the warming vary because of uncertainties in future emissions and the climate's sensitivity. According to a CEC report,[1129] projected warming scenarios predict temperatures to increase between 3.6 to 9ºF by 2100. To comprehend the magnitude of these projected temperature changes over the next century, the lower range is slightly larger than the difference in annual temperature between Monterey and Salinas, which is 2.5ºF, and the upper range of the warming is greater than the temperature difference between San Francisco and San Jose, which is 7.4ºF. Rising temperatures could have a variety of impacts, including stress on sensitive populations (e.g., sick and elderly), additional burden on building systems (e.g., demand for air conditioning), and, indirectly, increasing emissions of greenhouse gases and criteria pollutants associated with energy generation. It is not possible to reliably quantify these risks at this time.

The California Resources Agency (CRA)[1130] recently prepared a document that discusses the impacts of climate change upon California. CRA reports that extreme natural events are likely to occur, including higher nighttime temperatures and longer, more frequent heat waves overall; 12 to 35 percent decrease in precipitation levels by mid- to late-twenty-first century; increased evaporation and faster incidences of snowmelt that would increase drought conditions, and more precipitation in the form of rain as compared to snow that would decrease water storage in California during the dry season and increase flood events during the wet season.[1131]

CRA also states that climate change would intensify California's "Mediterranean climate pattern," with the majority of annual precipitation occurring between November and March and drier conditions during the summer.[1132] This would increase droughts and floods and would affect river systems. Climate change is expected to alter seasonal and inter-annual patterns of precipitation. These changes continue to be one of the most uncertain aspects of future scenarios. For this Project, the most relevant direct impacts are likely to be changes in the timing and volume of stormwater runoff and changes in demand for irrigation. It is not possible to reliably quantify the implications of these changes at this time.

Another impact of global climate change is increased fire hazard. Changes in temperature and precipitation may combine to alter risks of wildfire. Fire is an important natural disturbance within many California ecosystems that promotes vegetation and wildlife diversity, releases nutrients, and eliminates heavy fuel accumulations that can lead to catastrophic burns. The changing climate could alter fire regimes in ways that could have social, economic, and ecological consequences. As the existing climate throughout California changes over time, mass migration of species, or worse, failure of species to migrate in time to adapt to the changes in climate, could also result. Due to its weather, topography, and native vegetation, nearly all Northern California is at some risk from wildland fires also called wildfires. The extended droughts characteristic of California's Mediterranean climate result in large areas of dry vegetation that

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[1129]Cayan, D. et al. 2009. *Climate Change Scenarios and Seal Level Rise Estimates for the California 2008 Climate Change Scenarios Assessment*. PIER Research Report, CEC-500-2009-014, California Energy Commission.
[1130] California Natural Resources Agency. *2009 California Climate Adaptation Strategy*. Discussion Draft.
[1131] Cayan, Dan, Mary Tyree, Mike Dettinger, Hugo Hidalgo, Tapash Das, Ed Maurer, Peter Bromirski, Nicholas Graham, and Reinhard Flick (2009). *Climate Change Scenarios and Sea Level Rise Estimates for the California 2008 Climate Change Scenarios Assessment*. PIER Research Report, CEC-500-2009-014, Sacramento, CA: California Energy Commission.
[1132] Cayan et al. 2009.

provide fuel for wildland fires that can spread into urban areas. Wildland-urban fires occur when a fire burning in wildland vegetation gets close enough to ignite urban structures. Areas of dense, dry vegetation, particularly in canyon areas and hillsides pose the greatest wildland fire potential. Changes in wildfire hazard have the potential to impact the Project; however, it is not possible to reliably quantify the implications of these changes at this time.

Changes in temperature and precipitation may also influence seasonal and inter-annual availability of water supplies. Consequently, it is reasonable to consider that climate change may affect water supply reliability. It is not possible to reliably quantify these risks for the Project at this time.

CRA states that sea level rise can cause damage to coastal communities and loss of land. A detailed discussion of sea level rise predictions is provided in Section III.M (Hydrology and Water Quality) of this EIR. The San Francisco Bay Conservation and Development Commission (BCDC) has prepared maps for areas inundated by 16 inches of sea level rise by 2050 and 55 inches of sea level rise by 2100.[1133] Therefore, extrapolating BCDC projections to the 2075 mid-point, sea level rise would be about 36 inches (3 feet), although some studies have concluded this rise would not occur until after the year 2100.[1134]

The CRA also notes that an emerging effect from climate change may be acidification (i.e., a decrease in the pH of the ocean water, making it more acidic.) of the ocean. In turn, acidification would affect the ability of hard-shelled invertebrates to create their skeletal structures.[1135] The implications of this change being major losses to shellfish industries, and shifts in food resources for ocean fisheries. The primary contributing factors were cited as increasing levels of CO_2 and weather pattern shifts. Increases in CO_2 result in increased uptake (i.e., absorption of the CO_2 into the ocean water) by the oceans, which result in decreased pH (acidification). Weather pattern shifts change the amount of calcium carbonate being delivered by rivers from sources stored in rocks, which further exacerbates the ability of invertebrates to form calcified shells.[1136]

One of the main contributing factors to CO_2, outside of human influences, is melting permafrost. When permafrost thaws, it releases carbon into soil or beneath lakes and releases CO_2 and methane into the atmosphere. Scientists are now estimating that there is more than twice the total amount of carbon stored in permafrost as there is in atmospheric carbon dioxide, and "could amount to roughly half those resulting from global land-use change during this century."[1137]

The importance of addressing climate impacts for California was recognized with Executive Order S-13-08 which called on state agencies to develop California's first strategy to identify and prepare for these expected climate impacts. In response to S-13-08, CRA has developed a draft adaptation strategy. CRA

1133 San Francisco Bay Conservation and Development Commission (BCDC), April 7, 2009, *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline,* Draft Staff Report.
1134 Moffatt & Nichol, *Candlestick Point/Hunters Point Development Project Initial Shoreline Assessment*, prepared for Lennar Urban, February, 2009, op. cit.
1135 Risien, J. (ed.). 2009. *West Coast Regional Marine Research and Information Needs*. Corvallis, Oregon: Oregon Sea Grant. ORESU-Q-09-001.
1136 Griffith, E.M., A. Paytan, K. Caldeira, T. D. Bullen and E. Thomas. 2008. A dynamic marine calcium cycle during the past 28 million years. Science. December 12, 2008.
1137 Schuur, E.A.G. et al. 2008. Vulnerability of Permafrost Carbon to Climate Change: Implications for the Global Carbon Cycle. *BioScience.* 58(8): 701–714.

recognizes that mitigation of GHG emissions is not the only means of dealing with climate change. The CRA report states "To effectively address the challenges that a changing climate would bring, climate adaptation and mitigation (i.e., reducing state GHG emissions) policies must complement each other, and efforts within and across sectors must be coordinated." Adaptation refers to efforts to respond to the impacts of climate change not avoidance of the change. Adaptation is adjustments in natural or human systems to actual or expected climate changes to minimize harm or take advantage of beneficial opportunities. In the 2009 California Climate Adaptation Strategy Discussion Draft, the CRA made several recommendations. Key recommendations include:

- Appointment of a Climate Adaptation Advisory Panel
- Improved water management in anticipation of reduced water supplies, including a 20 percent reduction in per capita water use by 2020
- Consideration of project alternatives that avoid significant new development in areas that cannot be adequately protected from flooding due to climate change
- Preparation of agency-specific adaptation plans, guidance or criteria by September 2010
- Consideration of climate change impacts for all significant state projects
- Assessment of climate change impacts on emergency preparedness
- Identification of key habitats and development of plans to minimize adverse effects from climate change
- Development of guidance by the California Department of Public Health by September 2010 for use by local health departments to assess adaptation strategies
- Amendment of Plans to assess climate change impacts and develop local risk reduction strategies by communities with General Plans and Local Coastal Plans
- Inclusion of climate change impact information into fire program planning by state fire fighting agencies

Additional Climate Change Impacts

Ecosystems and Biodiversity[1138]

Climate change is expected to have effects on diverse types of ecosystems, from alpine to deep-sea habitat. As temperatures and precipitation change, seasonal shifts in vegetation would occur; this could affect the distribution of associated flora and fauna species. As the range of species shifts, habitat fragmentation could occur, with acute impacts on the distribution of certain sensitive species. The IPCC states that "20 percent to 30 percent of species assessed may be at risk of extinction from climate change impacts within this century if global mean temperatures exceed 2 to 3°C (3.6 to 5.4°F) relative to pre-industrial levels."[1139] Shifts in existing biomes could also make ecosystems vulnerable to invasive species encroachment. Wildfires, which are an important control mechanism in many ecosystems, may become more severe and more frequent, making it difficult for native plant species to repeatedly re-germinate. In general terms, climate change is expected to put a number of stressors on ecosystems, with potentially catastrophic effects on biodiversity.

[1138] EPA, 2008. *Climate Change – Ecosystems and Biodiversity*. http://www.epa.gov/climatechange/effects/eco.html (accessed January 3, 2009).

[1139] IPCC, 2007: *Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* [Parry, Martin L., Canziani, Osvaldo F., Palutikof, Jean P., van der Linden, Paul J., and Hanson, Clair E. (eds.)]. Cambridge University Press, Cambridge, United Kingdom, 1,000 pp.

Human Health Impacts[1140]

Climate change may increase the risk of vector-borne infectious diseases, particularly those found in tropical areas and spread by insects: malaria, dengue fever, yellow fever, and encephalitis. Cholera, which is associated with algal blooms, could also increase. While these health impacts would largely affect tropical areas in other parts of the world, effects would also be felt in California. Warming of the atmosphere would be expected to increase smog and particulate pollution, which could adversely affect individuals with heart and respiratory problems, such as asthma. Extreme heat events would also be expected to occur with more frequency, and could adversely affect the elderly, children, and the homeless. Finally, the water supply impacts and seasonal temperature variations expected as a result of climate change could affect the viability of existing agricultural operations, making the food supply more vulnerable.

Greenhouse Gas Emissions Inventories

Worldwide emissions of GHGs in 2004 were 26.8 billion tonnes of CO_2e.[1141] In 2004, the US emitted about 7 billion tonnes of CO_2e or about 24 tonnes of CO_2e per year per person.[1142] Over 80 percent of the GHG emissions in the US are comprised of CO_2 emissions from energy related fossil fuel combustion. In 2004, California emitted 0.492 billion tonnes of CO_2e, or about 7 percent of the US emissions.[1143] If California were a country, it would be the 16th largest emitter of GHGs in the world.[1144] This large number is due primarily to the sheer size of California. Compared to other states, California has one of the lowest per capita GHG emission rates in the country. This is due to California's higher energy efficiency standards, its temperate climate, and the fact that it relies on substantial out-of-state energy generation.

In 2004, 81 percent of greenhouse gas emissions (in CO_2e) from California were comprised of CO_2 emissions from fossil fuel combustion, with 4 percent comprised of CO_2 from process emissions. CH_4 and N_2O accounted for 5.7 percent and 6.8 percent of total CO_2e respectively, and high GWP gases[1145] accounted for 2.9 percent of the CO_2e emissions. Transportation is the largest end-use category of GHG emissions. Transportation includes that used for industry (i.e., shipping) as well as residential use.

In 2007, 102.6 million metric tonnes of CO_2-equivalent ($MMTCO_2e$) greenhouse gases were emitted by the San Francisco Bay Area (95.5 $MMTCO_2e$ were emitted within the Bay Area Air District and 7.1 $MMTCO_2e$ were indirect emissions from imported electricity).[1146] Transportation sources (e.g. fossil fuel combustion) were associated with 41 percent of the total emissions, industrial/commercial 34 percent,

[1140] EPA, 2008. *Climate Change – Health and Environmental Effects.* http://www.epa.gov/climatechange/effects/health.html#climate (accessed January 3, 2009).
[1141] Sum of Annex I and Annex II countries without counting Land-Use, Land-Use Change and Forestry (LULUCF) http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php For countries for which 2004 data was unavailable, the most recent year was used.
[1142] 2006 Inventory of US Greenhouse Gas Emissions and Sinks. http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/RAMR6MBLP4/$File/06ES.pdf.
[1143] California Air Resources Board. Note that 2004 is typically the most recent inventory year presented by the ARB; as such, USA- and world-wide emissions from 2004 are presented here to keep the comparison years the same.
[1144] Anywhere between the 12th and 16th depending upon methodology. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004*. California Energy Commission.
[1145] Such as HFCs and PFCs.
[1146] In February 2010, BAAQMD revised their 2007 GHG emission inventory to 95.8 $MMTCO_2e$. This reduction in emissions is attributable to decreased emissions assigned to ships and boats under the transportation category.

domestic 7 percent, power plants 15 percent, and off-road equipment 3 percent. In 1990, San Francisco's total GHG emissions were approximately 8.3 million metric tonnes CO_2e.

III.S.3 Regulatory Framework

Climate change has only recently been widely recognized as a threat to the global climate, economy, and population. As a result, the climate change regulatory setting—federal, state, and local—is complex and evolving. This section identifies key legislation, executive orders, and seminal court cases related to climate change germane to Project GHG emissions.

Federal

Currently, there is no federal legislation requiring reductions in GHG emissions. Rather, the United States Environmental Protection Agency (USEPA) administers a variety of voluntary programs and partnerships with GHG emitters in which the USEPA partners with industries producing and utilizing synthetic GHGs to reduce emissions of these particularly potent GHGs. There are federal actions requiring increasing automobile efficiency, an endangerment finding for CO_2, and a recently finalized regulation requiring large sources of GHG emissions to report their emission to the USEPA. In addition, there are several bills pending in Congress that are attempting to regulate GHG emissions in the United States; most of these bills require a cap and trade program where GHG emissions would be reduced overall through a market-driven approach.

April 2007 Supreme Court Ruling

In *Massachusetts et al. vs. Environmental Protection Agency et al.* (April 2, 2007) the US Supreme Court ruled that the *Clean Air Act* (CAA) authorizes the USEPA to regulate CO_2 emissions from new motor vehicles. The Court did not mandate that the USEPA enact regulations to reduce GHG emissions, but found that the only instances where the USEPA could avoid taking action if it were found that GHGs do not contribute to climate change or if it offered a "reasonable explanation" for not determining that GHGs contribute to climate change. On April 24, 2009 the USEPA issued a proposed endangerment finding, stating that high atmospheric levels of greenhouse gases "are the unambiguous result of human emissions, and are very likely the cause of the observed increase in average temperatures and other climatic changes." The USEPA further found that "atmospheric concentrations of greenhouse gases endanger public health and welfare within the meaning of Section 202 of the CAA." The finding itself does not impose any requirements on industry or other entities. The public comment period for this proposed endangerment finding ended June 23, 2009, and the finding is now under final review.[1147]

Corporate Average Fuel Efficiency Standards

In response to the *Massachusetts et al. vs. Environmental Protection Agency et al.* ruling, the Bush Administration issued an executive order on May 14, 2007, directing the USEPA and Departments of Transportation (DOT) and Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. On December 19, 2007, the *Energy Independence and Security Act of 2007* (EISA) (discussed below) was signed into law, which requires an increased Corporate Average Fuel Economy (CAFE) standard of 35 miles per gallon for the combined fleet of cars and light trucks by

[1147] Available at http://www.epa.gov/climatechange/endangerment.html.

model year 2020. EISA requires establishment of interim standards (from 2011 to 2020) that would be the "maximum feasible average fuel economy" for each fleet. On October 10, 2008, the National Highway Traffic Safety Administration (NHTSA) released a final environmental impact statement analyzing proposed interim standards for model years 2011 to 2015 passenger cars and light trucks. NHTSA issued a final rule for model year 2011 on March 23, 2009.[1148]

On May 19, 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the US auto industry. The proposed rulemaking is a collaboration between the DOT and USEPA with the support of the United Auto Workers. The proposed federal standards apply to passenger cars, light-duty trucks, and medium duty passenger vehicles built in model years 2012 through 2016. If finalized, the proposed rule would surpass the 2007 CAFE standards and require an average fuel economy standard of 35.5 mpg in 2016. On May 22, 2009, the DOT and USEPA issued a notice of upcoming joint rulemaking on this issue.[1149,1150] A Draft Environmental Impact Statement has been issued and the comment period for this ends on November 9, 2009. On June 30, 2009, the USEPA granted the waiver to California for its greenhouse gas emission standards for motor vehicles; this is described in more detail below.

Energy Independence and Security Act of 2007

In addition to setting increased CAFE standards for motor vehicles, the EISA includes other provisions:

- Renewable Fuel Standard (RFS) (Section 202)
- Appliance and Lighting Efficiency Standards (Section 301–325)
- Building Energy Efficiency (Sections 411–441)

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

Consolidated Appropriations Act of 2008 (HR 2764)

Congress passed the *Consolidated Appropriations Act of 2008* (HR 2764) in December 2007, which includes provisions requiring the establishment of mandatory GHG reporting requirements. The measure directed USEPA to publish draft rules by September 2008, and final rules by June 2009 mandating reporting "for all sectors of the economy." The USEPA finalized GHG reporting rules on September 22, 2009. The GHG reporting rule requires reporting of GHG emissions from facilities that emit 25,000 metric tonnes or more per year of GHG emissions and these are required to submit annual reports to EPA.

Congressional Bills

There are several pieces of proposed legislation in both the United States Senate and House of Representatives. While these pieces are not yet final enacted regulations, they are key pieces that could have an impact on GHG emission reductions. The *American Clean Energy and Security Act of 2009*, known as the Waxman-Markey Bill is an energy bill that would establish a cap-and-trade plan for GHG emission

[1148] http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.43ac99aefa80569eea57529cdba046a0/.
[1149] http://yosemite.epa.gov/opa/admpress.nsf/6fa790d452bcd7f58525750100565efa/.
451902cb77d4add5852575bb006d3f9b!OpenDocument.
[1150] http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.43ac99aefa80569eea57529cdba046a0/.

reductions of 17 percent by 2020 to address climate change and 80 percent reduction by 2050. It also includes a 20 percent renewable energy source and efficiency requirement for utilities by 2020. This bill was passed by the House of Representatives on June 26, 2009. The bill needs to be voted on in the Senate.

The Senate is working on a companion bill, which was referred to the Senate Environment and Public Works committee for consideration. This bill is the *Clean Energy Jobs and American Power Act* known as the Kerry-Boxer bill. This bill calls for a 20 percent reduction in GHG emissions by 2020 and greater than 80 percent reductions by 2050. This is higher than the Waxman-Markey bill passed in the House of Representatives.

State

California has enacted a variety of legislation that relates to climate change, much of which sets aggressive goals for GHG reductions within the state. However, none of this legislation provides definitive direction regarding the treatment of climate change in environmental review documents prepared under CEQA. As discussed below, the Office of Planning and Research (OPR) has been directed to develop CEQA Guidelines for the mitigation of GHG emissions and their effects; ARB must adopt regulations by January 1, 2010. OPR recently released a guidance document, discussed below, for analyzing GHG emissions under CEQA, but this document is purely advisory and serves as guidance only. On January 8, 2009, OPR released Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions. These amendments propose specific guidelines to public agencies for addressing GHG emissions as part of the general CEQA requirements to determine a project's effects on the environment. In addition, on October 24, 2008, ARB released a draft staff proposal entitled "Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the *California Environmental Quality Act*" (Draft ARB Thresholds). More detail was provided in another document released on December 9, 2008. However, the process of developing statewide guidance has been halted by the ARB. Because this process was halted, with no intention of continuing, it would not be further discussed in this section. On April 13, 2009, OPR submitted proposed amendments to the CEQA Guidelines for greenhouse gas emissions to the Secretary for Natural Resources.[1151,1152,1153] On July 3, 2009, the CRA commenced the *Administrative Procedure Act* rulemaking process for certifying and adopting these amendments. Public comments were accepted through August 20, 2009.

No relevant local, state, or regional agency has promulgated binding regulations for analyzing GHG emissions, determining their significance, or mitigating any significant effects in CEQA documents for residential and commercial developments. The discussion below provides a brief overview of the ARB and OPR documents and of the primary legislation that relates to climate change, which may affect the emissions associated with the Project.

Assembly Bill 32 (Statewide GHG Reductions)

The *California Global Warming Solutions Act of 2006*, widely known as AB 32, requires ARB to develop and enforce regulations for the reporting and verification of statewide greenhouse gas emissions. ARB is directed to set a greenhouse gas emission limit, based on 1990 levels, to be achieved by 2020. The bill sets a timeline for adopting a scoping plan for achieving greenhouse gas reductions in a technologically and economically feasible manner.

[1151] http://opr.ca.gov/index.php?a=ceqa/index.html.
[1152] http://ceres.ca.gov/ceqa/guidelines/.
[1153] http://www.arb.ca.gov/cc/localgov/ceqa/ceqa.htm.

The heart of the bill is the requirement that statewide GHG emissions must be reduced to 1990 levels by 2020. California needs to reduce GHG emissions by approximately 29 percent below business-as-usual predictions of year 2020 GHG emissions to achieve this goal. The bill requires ARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. Key AB 32 milestones include:

- June 30, 2007—Identification of discrete early action greenhouse gas emissions reduction measures. On June 21, 2007, ARB satisfied this requirement by approving three early action measures. These were later supplemented by adding six other discrete early action measures.
- January 1, 2008—Identification of the 1990 baseline GHG emissions level and approval of a statewide limit equivalent to that level. Adoption of reporting and verification requirements concerning GHG emissions. On December 6, 2007, ARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.
- January 1, 2009—Adoption of a scoping plan for achieving GHG emission reductions. On October 15, 2008, ARB issued a "discussion draft" Scoping Plan entitled "Climate Change Draft Scoping Plan: A Framework for Change" (Draft Scoping Plan). ARB adopted the Draft Scoping Plan at its December 11, 2008 meeting.
- January 1, 2010—Adoption and enforcement of regulations to implement the "discrete" actions.
- January 1, 2011—Adoption of GHG emissions limits and reduction measures by regulation.
- January 1, 2012—GHG emissions limits and reduction measures adopted in 2011 become enforceable.

Executive Order S-3-05 (Statewide GHG Targets)

California Executive Order S-03-05 (June 1, 2005) mandates a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. Although the 2020 target is the core of AB 32, and has effectively been incorporated into AB 32, the 2050 target remains the goal of the Executive Order.

Low Carbon Fuel Standard (LCFS)

Executive Order S-01-07 (January 18, 2007) requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by ARB. ARB identified the LCFS as a Discrete Early Action item under AB 32, and the final resolution (09-31) was issued on April 23, 2009.[1154]

Senate Bill 1368 (GHG Emissions Standard for Baseload Generation)

Senate Bill (SB) 1368 prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard applies to electricity generated out of state as well as in state, and to publicly owned as well as investor-owned electric utilities.

[1154] http://www.arb.ca.gov/fuels/lcfs/lcfs.htm.

Assembly Bill 1493 (Mobile Source Reductions)

AB 1493 requires ARB to adopt regulations by January 1, 2005, to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. The bill requires the CCAR to develop and adopt protocols for the reporting and certification of greenhouse gas emissions reductions from mobile sources for use by ARB in granting emission reduction credits. The bill authorizes ARB to grant emission reduction credits for reductions of greenhouse gas emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2004, ARB applied to the USEPA for a waiver under the federal CAA to authorize implementation of these regulations. The waiver request was formally denied by the USEPA in December 2007 after California filed suit to prompt federal action. In January 2008 the State Attorney General filed a new lawsuit against the USEPA for denying California's request for a waiver to regulate and limit GHG emissions from these automobiles. In January 2009, President Barack Obama issued a directive to the USEPA to reconsider California's request for a waiver. On June 30, 2009 the USEPA granted the waiver for California for its greenhouse gas emission standards for motor vehicles. As part of this waiver, USEPA specified the following provision: ARB may not hold a manufacturer liable or responsible for any noncompliance caused by emission debits generated by a manufacturer for the 2009 model year. California has agreed to cooperate with the federal CAFE and GHG emission reductions in order for there to be one national standard.

Senate Bills 1078 and 107 (Renewables Portfolio Standard)

Established in 2002 under SB 1078 and accelerated in 2006 under SB 107, California's RPS requires retail suppliers of electric services to increase procurement from eligible renewable energy resources by at least 1 percent of their retail sales annually, until they reach 20 percent by 2010.

Executive Order S-14-08 and S-21-09 (Renewables Portfolio Standard)

California Executive Order S-14-08 (November 11, 2008) mandates retail suppliers of electric services to increase procurement from eligible renewable energy resources to 33 percent by 2020. This has been reiterated by California Executive Order S-21-09 which charges ARB by July 31, 2010 to establish a regulation consistent with this 33 percent target by 2020. This is a further increase in RPS over SB 1078 and SB 107.

Senate Bill 375 (Land Use Planning)

SB 375 provides for a new planning process to coordinate land use planning and regional transportation plans and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans, developed by Metropolitan Planning Organizations (MPOs) relevant to the Project site (including the Metropolitan Transportation Commission (MTC)), to incorporate a "sustainable communities strategy" in their regional transportation plans (RTPs) that would achieve GHG emission reduction targets set by ARB. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. SB 375 would be implemented over the next several years.

SB 375 is similar to the Regional Blueprint Planning Program, established by the California Department of Transit, which provides discretionary grants to fund regional transportation and land use plans voluntarily developed by MPOs working in cooperation with Councils of Government. MTC's 2013 RTP would be

its first plan subject to SB 375. The Scoping Plan adopted by ARB in December of 2008 relies on the requirements of SB 375 to implement the carbon emission reductions anticipated from land use decisions. The Regional Targets Advisory Committee (RTAC) established by SB 375 recently provided its recommendations to ARB.

Energy Conservation Standards

Energy Conservation Standards for new residential and non-residential buildings were first adopted by California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the *California Code of Regulations* [CCR]).[1155] In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608), dated December 2006, were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. While these regulations are now often seen as "business as usual," they do exceed the standards imposed by any other state and reduce GHG emissions by reducing energy demand.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The *California Green Building Standards Code* (proposed Part 11, Title 24) was adopted as part of the *California Building Standards Code* (Title 24, CCR). Part 11 establishes voluntary standards, which would become mandatory in the 2010 edition of the Code, on planning and design for sustainable site development, energy efficiency (in excess of the *California Energy Code* requirements), water conservation, material conservation, and internal air contaminants.

Office of Planning and Research Advisory on CEQA and Climate Change

In June 2008, the OPR published a technical advisory entitled *CEQA and Climate Change: Addressing Climate Change Through CEQA* (OPR Advisory). This guidance, which is purely advisory, proposes a three-step analysis of GHG emissions:

1. **Mandatory Quantification of GHG Project Emissions.** The environmental impact analysis must include quantitative estimates of a project's GHG emissions from different types of air emission sources. These estimates should include both construction-phase emissions, as well as completed operational emissions, using one of a variety of available modeling tools.
2. **Assessment of "Significance" of Project-Specific GHG Emissions.** Each EIR document should assess the significance of the project's impacts on climate change. The OPR Advisory recognizes uncertainty regarding what GHG impacts should be determined to be significant and encourages agencies to rely on the evolving guidance being developed in this area. According to the OPR Advisory, the environmental analysis should describe a "baseline" of existing (pre-project) environmental conditions, and then add project GHG emissions on to this baseline to evaluate whether impacts are significant.

[1155] Although new building energy efficiency standards were adopted in April 2008, these standards do not go into effect until January 1, 2010. Thus, the 2005 standards that went into effect on October 1, 2005 remain the current Title 24 standards.

3. **Mitigation Measures.** According to the OPR Advisory, "all feasible" mitigation measures or project alternatives should be adopted if an impact is significant, defining feasibility in relation to scientific, technical, and economic factors. If mitigation measures cannot sufficiently reduce project impacts, the agency should adopt whatever measures are feasible and include a fact-based statement of overriding considerations explaining why additional mitigation is not feasible. OPR also identifies a menu of GHG emissions mitigation measures, ranging from balanced "mixed-use" master-planned project designs to construction equipment and material selection criteria and practices.

In addition to this three-step process, the OPR Advisory contains more general policy-level guidance. It encourages agencies to develop standard GHG emissions reduction and mitigation measures. The OPR Advisory directs ARB to recommend a method for setting the GHG emissions threshold of significance, including both qualitative and quantitative options.

Senate Bill 97 (CEQA Guidelines)

SB 97 requires that OPR prepare guidelines to submit to the California Resources Agency regarding feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by CEQA. The Resources Agency is required to certify and adopt these revisions to the CEQA Guidelines by January 1, 2010. The Guidelines would apply retroactively to any incomplete environmental impact report, negative declaration, mitigated negative declaration, or other related document.[1156]

The CRA received recommended Amendments to the CEQA Guidelines for greenhouse gas emissions from the Governor's Office of Planning and Research on April 13, 2009. On July 3, 2009, the CRA commenced the *Administrative Procedure Act* rulemaking process for certifying and adopting these amendments pursuant to *Public Resources Code* Section 21083.05. During the process, CRA would hold public hearings, receive oral comments, consider both written and oral comments, and publish the final rule, which would take into consideration comments made.

The January 8, 2009, Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions state that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

- Extent the project helps or hinders the goals of AB 32
- Extent project may increase consumption of fuel and energy resources
- Extent project impacts or emissions exceed any threshold of significance

No specific methodologies for performing an assessment are indicated, but rather it is left to the lead agency to determine the appropriate methodologies in context of a particular project.

The proposed amendments indicate that lead agencies should consider all feasible means of mitigating greenhouse gas emissions that substantially reduce energy consumption or GHG emissions. These potential mitigation measures may include carbon sequestration (i.e., long-term storage of carbon dioxide or other forms of carbon). If off-site or carbon-offset mitigation measures are proposed they must be part

[1156] Senate Bill No. 97. CHAPTER 185. An act to add Section 21083.05 to, and to add and repeal Section 21097 of, the Public Resources Code, relating to the California Environmental Quality Act. http://www.opr.ca.gov/ceqa/pdfs/SB_97_bill_20070824_chaptered.pdf.

of reasonable plan of mitigation that the agency itself is committed to implementing. No threshold of significance or any specific mitigation measures are indicated.

Regional

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) is the primary agency responsible for comprehensive air pollution control in the entire San Francisco Bay Area Air Basin. Currently, BAAQMD does not have an adopted or recommended threshold of significance for GHG emissions. However, BAAQMD is in the process of updating its CEQA Guidelines, which includes the development of recommended significance thresholds, assessment methodologies, and mitigation strategies for GHG emissions. The draft approach that BAAQMD is considering in their September 2009 document entitled *California Environmental Quality Act Draft Air Quality Guidelines* includes GHG thresholds for land-use development projects. BAAQMD presents three different criteria that could be used for determining significance of mixed-use development's operational GHG emissions. One option would include a numeric "bright line" threshold of 1,100 metric tonnes CO_2e per year for operational emission sources including residential and non-residential building energy use, mobile source emissions, area source emissions, and indirect emissions associated with water usage. The second option is a metric based on the service population (the residential population plus the number of jobs associated with the land-uses). This metric is 4.6 tonnes per service population per year for operational emissions. The third option is compliance with a qualified Climate Action Plan that includes enforceable measures to reduce GHG emissions consistent with AB 32 goals or Executive Order S-03-05 targets. The BAAQMD expects to adopt new thresholds of significance later this year. In October 2009, BAAQMD posted updates to the staff-recommended CEQA thresholds of significance, which eliminate any climate change thresholds of significance criteria for construction emissions.[1157] Therefore, these are not discussed.

Local

In February 2002, the San Francisco Board of Supervisors passed the Greenhouse Gas Emissions Reduction Resolution (Resolution 158-02) committing the City to a GHG emissions reduction goal of 20 percent below 1990 levels by the year 2012. The resolution also directs the San Francisco Department of the Environment, the San Francisco Public Utilities Commission (SFPUC), and other appropriate City agencies are required to complete a GHG emission reduction action plan. In September 2004, the San Francisco Department of the Environment and the SFPUC published the Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Emissions (Plan). Although the San Francisco Board of Supervisors has not formally committed the City to perform the actions addressed in the Plan, and many of the actions require development and commitment of resources, it is a blueprint for GHG emission reductions, and several of the actions are now in progress.

The Plan presents estimates of San Francisco's baseline GHG inventory and reduction targets. It states that burning fossil fuels in vehicles and for energy use in buildings and facilities is the major contributor to

[1157] Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Staff-Recommended%20and%20Existing%20CEQA%20Thresholds%20Table%2010-07-09.ashx.

San Francisco's GHG emissions; in 1990, burning fossil fuels for these purposes produced approximately 8.3 million metric tonnes of CO_2. The Plan also describes recommended emissions reduction actions in the key target sectors: transportation, energy efficiency, renewable energy, and solid waste management to meet stated goals by 2012.

The Plan presents proposals to reduce annual CO_2 emissions by 2.5 million tons by 2012, a 20 percent reduction below 1990 emissions, including greening vehicle fleets; increasing energy efficiency in public and private buildings; developing renewable energy technologies like solar, wind, fuel cells, and tidal power; and expanding residential and commercial recycling programs. The roadmap to achieving these goals requires the cooperation of a number of City, regional, and state agencies as well as private sector partners. The City is already implementing a wide range of actions (e.g., transportation, solar, and energy efficiency) to reduce GHG emissions.

Greenhouse Gas Reduction Ordinance

In May 2008, the City adopted an ordinance amending the *Environment Code* to establish GHG emission targets and action plans, to authorize the Department of the Environment to coordinate efforts to meet these targets, and to make environmental findings. The ordinance establishes the following GHG emission reduction limits and target dates for San Francisco:

- Determine 1990 City GHG emissions by 2008 (baseline level with reference to which target reduction are set)
- Reduce GHG emissions by 25 percent below 1990 levels by 2017
- Reduce GHG emission by 40 percent below 1990 levels by 2025
- Reduce GHG emissions by 80 percent below 1990 levels by 2050

The ordinance also requires City departments to prepare Climate Action Plans that assess and report GHG emissions and to prepare recommendations to reduce emissions. The San Francisco Planning Department is also required to (1) update and amend the City's applicable General Plan elements to include the emissions reduction limits set forth in the GHG reduction ordinance and policies to achieve those targets; (2) consider a project's impact on the City's GHG reduction limits as part of its review under CEQA; and (3) work with other City department to enhance the "transit first" policy to encourage a shift to sustainable modes of transportation, thereby reducing emissions and helping to achieve the targets set forth by the ordinance.

Green Building Code

On August 5, 2008, the City adopted the *San Francisco Building Code* (SFBC), Chapter 13C, "green building codes" for new construction and for renovations of existing structures, consistent with the GHG reduction measures in the SFCAP. The new green building standards in SFBC Chapter 13C are to be phased in by 2012. At 2012, the ordinance specifically requires newly constructed commercial buildings over 5,000 square feet (sf) to be subject to Leadership in Energy and Environmental Design (LEED®) Gold, residential buildings over 75 feet in height to be LEED® certified or an equivalent standard, and other residential buildings to be subject to GreenPoint Rated to 75 points, which makes San Francisco the city with the most stringent green building requirements in the nation. The ordinance identifies cumulative benefits through the year 2012 which include reducing CO_2 emissions by 60,000 tons, saving 220,000 megawatt hours of power, saving 100 million gallons of drinking water, reducing waste and storm water

by 90 million gallons of water, reducing construction and demolition waste by 700 million pounds, increasing the valuations of recycled materials by $200 million, reducing automobile trips by 540,000, and increasing green power generation by 37,000 megawatt hours.

New projects would be evaluated on a point system with credit given for materials used in the building, the location of the building site and water and energy efficiencies. The new codes focus on water and energy conservation, recycling and reduction of carbon emissions. They apply to most buildings in the City, including residential projects of all sizes, new commercial buildings, and renovations of large commercial spaces. Large residential and commercial buildings would be evaluated under the LEED® rating system. Medium and small residential construction would use the GreenPoint rating system, which is less stringent.

Transit First Policy

In 1973, San Francisco instituted the Transit First Policy, which added Section 16.102 to the City Charter with the goal of reducing the City's reliance on freeways and meeting transportation needs by emphasizing mass transportation. The Transit First Policy gives priority to public transit investments; adopts street capacity and parking policies to discourage increased automobile traffic; and encourages the use of transit, bicycling and walking rather than use of single-occupant vehicles. Subsequent updates to the Planning Code have enhanced this commitment with provisions that have requirements to encourage the use of transit, walking and bicycling while discouraging driving. Some of these include required bicycle parking, required spaces for shared car services, shower facilities and lockers in commercial and industrial buildings, separation of parking costs from housing costs in new residential buildings, and transportation management programs.

In 2007, voters in San Francisco passed Proposition A, which requires a reduction of GHG emissions on the order of 20 percent, specific to the transportation sector. As part of this the San Francisco Municipal Transportation Authority (SFMTA) is developing a Climate Action Plan to meet the goals of this Proposition.

San Francisco has also recently adopted a Bicycle Plan that aims to encourage and increase the number of bicycle trips made in the city by further enhancing the bicycle network and adopting bicycle friendly policies.

San Francisco adopted a commuter benefits ordinance that requires all employers in San Francisco that have 20 or more employees to offer a commuter benefits program.

San Francisco Sustainability Plan

In 1993, the San Francisco Board of Supervisors established the Commission on San Francisco's Environment, charged with, among other things, drafting and implementing a plan for San Francisco's long-term environmental sustainability. The notion of sustainability is based on the United Nations definition that "a sustainable society meets the needs of the present without sacrificing the ability of future generations and non-human forms of life to meet their own needs." The Sustainability Plan for the City of San Francisco was a result of community collaboration with the intent of establishing sustainable development as a fundamental goal of municipal public policy.

The Sustainability Plan is divided into 15 topic areas, 10 that address specific environmental issues (air quality; biodiversity; energy, climate change and ozone depletion; food and agriculture; hazardous materials; human health; parks, open spaces, and streetscapes; solid waste; transportation; and water and wastewater), and five that are broader in scope and cover many issues (economy and economic development, environmental justice, municipal expenditures, public information and education, and risk management). Additionally, the Sustainability Plan contains indicators designed to create a base of objective information on local conditions and to illustrate trends toward or away from sustainability. Although the Sustainability Plan became official City policy in July 1997, the Board of Supervisors has not committed the City to perform all of the actions addressed in the plan. The Sustainability Plan serves as a blueprint, with many of its individual proposals requiring further development and public comment.

The Electricity Resource Plan (Revised December 2002)

San Francisco adopted the Electricity Resource Plan to help address growing environmental health concerns in San Francisco's southeast community, home of two power plants. The plan presents a framework for assuring a reliable, affordable, and renewable source of energy for the future of San Francisco.

San Francisco Municipal Transportation Agency's Zero Emissions 2020 Plan

The SFMTA's Zero Emissions 2020 plan focuses on the purchase of cleaner transit buses including hybrid diesel-electric buses. Under this plan hybrid buses would replace the oldest diesel buses, some dating back to 1988. The hybrid buses emit 95 percent less particle matter (PM, or soot) than the buses they replace, the produce 40 percent less oxides of nitrogen (NO_X), and they reduce greenhouse gases by 30 percent.

LEED® Silver for Municipal Buildings

In 2004, the City amended Chapter 7 of the *San Francisco Environment Code*, requiring all new municipal construction and major renovation projects to achieve LEED® Silver Certification from the US Green Building Council.

Zero Waste

In 2004, the City committed to a goal of diverting 75 percent of its waste from landfills by 2010, with the ultimate goal of zero waste by 2020. San Francisco currently recovers 72 percent of discarded material.[1158] In 2009, the City added Chapter 19 to its *Environment Code*, which outlines the City's mandatory recycling and composting program. All people are required to separate their waste into recyclables, compostables, and trash; and all property managers, food vendors, and refuse collectors are required to supply appropriately designed containers so that refuse can be easily be separated.

Construction and Demolition Debris Recovery Ordinance

In 2006, the City adopted Ordinance No. 27-06, requiring all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of the material from landfills. This ordinance applies to all construction, demolition, and remodeling projects within the City.

[1158] San Francisco Department of the Environment Zero Waste program overview: http://www.sfenvironment.org/our_programs/overview.html?ssi=3.

In August 2008, Mayor Gavin Newsom signed into law San Francisco's Green Building Ordinance (codified as Chapter 13C of the SFBC) for newly constructed residential and commercial buildings and renovations to existing buildings. The City's Green Building Ordinance includes a requirement to redirect at least 75 percent of construction and demolition waste from landfills.

GoSolarSF

In 2008, the San Francisco Public Utilities Commission (SFPUC) launched the "GoSolarSF" program to San Francisco's businesses and residents, offering incentives in the form of a rebate program that could pay for approximately half the cost of installation of a solar power system, and more to those qualifying as low-income residents.

The Planning Department and Department of Building Inspection have also developed a streamlining process for Solar Photovoltaic Permits and priority permitting mechanisms for projects pursuing LEED® Gold Certification.

Other Local Ordinances

San Francisco has implemented several planning and zoning ordinances that address land use related GHG emissions. Some of these ordinances enhance neighborhood-serving retail, preserve and enhance the City's supply of affordable housing, and ensure that commuter traffic does not impede Muni transit service or overburden streets and parking. The City has a ban on non-approved wood burning fireplaces. The City has a transit impact development fee that applies to many new land-use development projects to offset the impact on the transportation system. For water efficiency measures the City has several ordinances including limitations on water use for landscaping in new developments.

III.S.4 GHG Emissions Inventory

Inventory Method

Project-generated GHG emissions were developed based on methodologies and emission factors recommended by CCAR, IPCC, and other government agencies to determine whether project implementation would conflict with the state goal of reducing GHG emissions in California to 1990 levels by 2020 (i.e., whether project GHG emissions would result in a substantial contribution to global climate change), as set forth by the timetable established in AB 32 or with San Francisco's Climate Action Plan[1159] such that the project would impede implementation of the local GHG reduction goals established by the 2008 Greenhouse Gas Reduction Ordinance.[1160] Project-specific information was used to determine the total GHG emissions. In addition, energy usage studies specific to the anticipated building uses were used.

[1159] San Francisco Department of Environment. 2004. *Climate Action Plan for San Francisco.* http://www.sfenvironment.org/downloads/library/climateactionplan.pdf.
[1160] *San Francisco Municipal Code*, California Chapter 9 Greenhouse Gas Emissions Targets and Departmental Action Plans. http://www.municode.com/library/HTML/14134/ch009.html.

The methods used in this EIR apply local emission factors for the carbon intensity of electricity which are those recommended by the CCAR to be used in GHG emission inventories.[1161]

The Project consists of the construction and occupancy of the Project site. Project GHG emissions were calculated using guidance from the CCAR and IPCC. The GHG emissions inventory relied on scientific studies and studies conducted by government agencies that provide data on energy use patterns associated with building energy use, municipal activities, natural resources distribution, and other activities that would take place as part of the Project . The GHG emission inventory was developed using several models to estimate GHG emissions from the Project. These include the OFFROAD 2007 model, EMFAC model, and the URBEMIS model.

A GHG inventory was prepared for the Project by ENVIRON International Corporation (ENVIRON) to identify both the one-time emissions and annual emissions that are expected to occur each year after build-out of the Project. The following analysis is a summary of this report.[1162]

This inventory was prepared as a "worst-case" analysis. For example, it assumes that all emissions from the Project would be "new," in the sense that, absent the development of the Project, these emissions would not occur. Given the global nature of GHG emissions, "new" global GHG emissions are those caused by economic growth and population growth (births); local development projects accommodate such growth.

As an example of why these are worst-case emissions, these emissions are estimated assuming that there would be no reductions in GHG-generating activities over time. This would be unlikely, and presents a conservative analysis, given the expected reductions in GHG emissions from most activities that would take place over the years due to future regulations, greater public awareness, and the likely increasing costs of energy.

At the entitlement stage of a development, while the number of homes, the approximate size of commercial areas, and the locations of both are known, the exact designs of the homes, businesses, and facilities are not. The types of buildings and the types of facilities at the future project site can be used for developing an estimate of the project's anticipated GHG emissions. Energy used in a building depends in part on the built environment; however, actual future emissions from the site would depend heavily upon the future homeowners' and business owners' habits. Because the actual future occupants and their habits are not yet known, average current behavior is assumed. That assumption is likely to be a "worst-case" assumption. Given the current regulatory environment and the media focus on global climate change, it is likely that the actual future occupants would be more sensitive to the GHG emissions caused by their activities and, therefore, their activities would result in lower GHG emissions than average current behavior shows.

The GHG emissions inventory includes some aspects that are fully within the control of the project, such as grading and the placement of utilities; some aspects that are in control of the individuals building the houses and commercial buildings, such as construction emissions; and some aspects for which control over

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[1161] The CCAR General Reporting Protocol version 3.1 states on p. 34, "If your electricity provider reports an electricity delivery metric under the California Registry's Power/Utility Protocol, you may use this factor to determine your emissions, as it is more accurate than the default regional factor."
http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf.

[1162] ENVIRON International Corporation. 2009. *Climate Change Technical Report Candlestick Point–Hunters Point Shipyard Phase II Development Plan*. October (Appendix S to this EIR).

emissions is shared by the developers and the residents, such as energy use in the built environment and emissions from traffic by the development's future residents and employees in the commercial areas.

The timeframe over which GHGs are emitted varies from category to category, which is taken into consideration in the emissions inventory. For most of the categories, GHGs would be emitted every year that the development is inhabited. For these categories (residential buildings, nonresidential buildings, mobile sources, municipal services, and area sources), the inventory includes estimates of annual GHG emissions from ongoing operations associated with the Project. GHG emissions from two of the categories, construction and changes in vegetation sequestration, are one-time events that would not be part of the Project's ongoing activity. These one-time emissions can be divided by the estimated lifetime of the Project to allow direct comparison of these two emissions classes. The inventory presents estimates of these one-time emissions, converts them to annualized estimates, and integrates them into an annual inventory.

Conceptual Design Features

The GHG emission inventory assumed the incorporation of several conceptual design features in its analysis. These conceptual design features are part of the Project. However, since there could be modifications during the entitlement and development process, these have been incorporated as mitigation measures to ensure that the Project would not be redesigned to omit these critical features. There has been no analysis of the GHG emissions without these conceptual design features. The conceptual design features are listed below and further discussed in the GHG emission inventory for individual source categories.

Project Design Features Whose Emissions Reductions Were Incorporated into the Analysis

- Provide neighborhood-serving retail.
- Provide automobile, public transportation, and pedestrian connections between the Shipyard, Candlestick Point, and the larger Bayview neighborhood.
- The urban design of the Project would reduce its footprint and allow for transportation and open space corridors.
- Integrate land use patterns with multimodal street networks that would facilitate walking and cycling for internal trips and transit for trips of greater distance.
- Extend existing Muni routes to better serve the Project site and area; increase frequencies on existing routes to provide more capacity; and complement those existing routes with new transit facilities and routes that would serve the Project's proposed land use program and transit demand.
- The Project is a redevelopment project and would not result in the conversion of any new land to settlement.
- Plant up to 10,000 trees net new trees at the Project site and in the community.
- Exceed the 2008 Standards for Title 24 Part 6 energy efficiency standards for homes and businesses by at least 15 percent.
- Install ENERGY STAR[1163] appliances, where appliances are offered by homebuilders.
- Use energy efficient street lighting.

[1163] The term ENERGY STAR is capitalized as is the convention used by the United States Environmental Protection Agency and Department of Energy.

Project Design Features Whose Emissions Reductions Were Not Incorporated into the Analysis but Could Yield Further GHG Emissions Savings

- Transportation Demand Management Plan to reduce the auto use and encourage residents, employees and visitors to use alternative modes of travel, such as transit, walking, and bicycling.
- The energy savings resulting from the replacement of 256 older homes with new more energy efficient homes.
- The Project would provide a network of reclaimed-water mains for dual plumbing in commercial buildings and for irrigation of landscaped areas. Reclaimed water mains would distribute reclaimed water when and if the City develops a reclaimed source of water.

Standard Conditions

The Project would follow all applicable regulations and ordinances in existence at the time of Project construction. The follow rules and regulations are currently in existence and would be followed:

- Non-approved types of wood-burning stoves and fireplaces are prohibited.
- Residential and non-residential buildings must follow the *Green Building Code*.

GHG Emission Inventory

Short-Term (One-Time) Impacts

Short-term or one-time emissions from the development of this Project are associated with vegetation removal and re-vegetation on the Project site and construction-related activities. Construction activities also include a life-cycle analysis estimating the GHG associated with the manufacture and transport of building materials and infrastructure. As previously mentioned, this estimate for life-cycle emissions is used for comparison purposes only and is not included in the final inventory as these emissions would be accounted for under AB 32 in other industry sectors.

Vegetation Sequestration Change

The Project site is located on land classified as settlement as classified by the IPCC publication Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). There would be no changes in the land use classification. The overall CO_2 emissions due to vegetation change would result from the amount that can be expected to be sequestered by new plantings. The Project would plant approximately 10,000 net new trees at the Project site and in the community. These trees would sequester approximately 7,000 metric tonnes CO_2. This is based on an average tree sequestration rate of 0.035 tonne CO_2 per year per tree for 20 years of growth. Thus, the net CO_2 emission would be -7,000 tonnes CO_2e. These trees would continue to sequester carbon after 20 years, although at a slower rate and is typically offset by losses from clipping, pruning, and occasional death.

Construction-Related Activities

CO_2 emissions associated with different aspects of urban development can be estimated using a combination of software programs. The OFFROAD2007[1164] and the EMFAC2007[1165] models are used to generate emission factor data for construction equipment and motor vehicles, respectively. These values serve as inputs for the URBEMIS[1166] model, which estimates emissions from several different aspects of urban development including from construction sources based on emission factors and information specific to the Project.

Assumptions regarding construction timing and the number, type, and operating hours of equipment are based on the number and type of equipment that would be used in the construction of the Project, as well as the duration of the different construction phases[1167]. These assumptions are used with CO_2 specific emission factors compiled in OFFROAD 2007 and EMFAC2007. The URBEMIS model estimate does not analyze emissions from construction related electricity or natural gas consumption. Construction-related electricity and natural gas emissions vary based on the amount of electric power used during construction and other unknown factors that make them too speculative to quantify. In addition, this is typically a relatively small contribution to GHG emissions during construction.

Table III.S-2 (Project Construction GHG Emissions) summarizes the output results from Table 3-5 of the GHG inventory and presents the emissions estimates in metric tonnes of CO_2. The table indicates that an estimated 129,274 tonnes CO_2e emissions from Project construction equipment would be emitted over the course of the entire construction period.

Table III.S-2 Project Construction GHG Emissions

Location	*Construction Equipment*	*Worker Commuting*	*Hauling*	*Total GHG Emissions*
Candlestick Point	56,403	2,913	6,103	***65,419***
Hunters Point Shipyard Phase II	42,895	2,734	18,226	***63,854***
Total	***99,298***	***5,647***	***24,329***	***129,274***

SOURCE: ENVIRON, Updated Project Phasing Effect on Air Quality and Climate Change Analyses, Candlestick Point-Hunters Point Shipyard Phase II Development Plan, 2009.

If these one-time emissions are annualized assuming a 40-year development life (which is likely low), the one-time emissions contribute approximately 3,232 tonnes CO_2e emissions annually. These annualized emissions are added to the total Project-related GHG emissions in Table III.S-3 (Annual Project Related Operational CO_2e Emissions).

[1164] California Air Resources Board Mobile Source Emissions Inventory Program. December 2006. http://www.arb.ca.gov/msei/offroad/offroad.htm.
[1165] Emission Factors (EMFAC2007) model (Version 2.3). November 2006. California Air Resources Board. http://www.arb.ca.gov/msei/onroad/latest_version.htm.
[1166] Urban Emissions Model (URBEMIS) (Version 9.2.4) 2008. Jones & Stokes Associates. Prepared for: South Coast Air Quality Management District. http://www.urbemis.com.
[1167] ENVIRON International Corporation. 2009. *Climate Change Technical Report Candlestick Point–Hunters Point Shipyard Phase II Development Plan*. October (Appendix S to this EIR).

An estimate of "life-cycle" GHG emissions (i.e., GHG emissions from the processes used to manufacture and transport materials used in the buildings and infrastructure) was also performed. As previously stated, this estimate is used for comparison purposes only and is not included in the final GHG inventory because these emissions would be attributable to other industry sectors under AB 32. For instance, the concrete industry is required by law to report emissions and undergo certain early action emission reduction measures. Furthermore, somewhat arbitrary boundaries must be drawn to define the processes considered in the life-cycle analysis of building materials.[1168] Recognizing the uncertainties associated with a life-cycle analysis, the California Air Pollution Control Officers Association (CAPCOA) released a white paper that states: "The full life-cycle of GHG emissions from construction activities is not accounted for in the modeling tools available, and the information needed to characterize GHG emissions from manufacture, transport, and end-of-life of construction materials would be speculative at the CEQA analysis level."[1169]

Life Cycle Assessment (LCA) emissions vary based on input assumptions and assessment boundaries (e.g., how far back to trace the origin of a material). Assumptions made in the LCA are generally conservative. However, due to the open-ended nature of LCAs, the analysis is also highly uncertain.

The LCA evaluates the life-cycle GHG emissions associated with the building materials for this Project. The life-cycle GHG emissions include the embodied energy from the materials manufacture and the energy used to transport those materials to the site. The report then compares the life-cycle GHG emissions to the overall annual Project-related emissions. The materials analyzed in the report include materials for (1) residential and non-residential buildings and (2) site infrastructure.

The LCA estimated the life-cycle GHG emissions for buildings by conducting an analysis of available literature on LCAs for buildings. According to these studies, approximately 75 to 97 percent of GHG emissions from buildings is associated with energy usage during the operational phase; the other 3 to 25 percent of the GHG emissions is due to material manufacture and transport. Using the GHG emissions from the operation of buildings, 3 to 25 percent of building emissions corresponds to approximately 0.9 to 9 percent of the Project emissions.

The LCA calculated the life-cycle GHG emissions for certain components of infrastructure (roads, storm drains, utilities, gas, electricity, and cable). The analysis considered the manufacture and transport of concrete and asphalt only, because it assumed that other construction materials such as steel would be present in much smaller quantities. Because the manufacture of concrete has a higher CO_2 emission factor and most construction estimates higher quantities of concrete than asphalt, the majority of the emissions for infrastructure result from the manufacture of concrete. Because the asphalt and concrete are locally sourced, the transportation emissions are relatively small. If a 40-year lifespan of the infrastructure is assumed, the total annualized emissions from embodied energy in infrastructure materials are approximately 1.8 percent of the Project emissions.

[1168] For instance, in the case of building materials, the boundary could include the energy to make the materials, the energy used to make the machine that made the materials, and the energy used to make the machine that made the machine that made the materials.

[1169] CAPCOA. 2008. *CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act.* http://www.capcoa.org/ceqa/?docID=ceqa&PHPSESSID=df1348d67eff0fc2a8263d19d10dd.

The overall life-cycle emissions, annualized by 40 years, would be 3,068 to 16,285 tonnes CO_2/year, or 2 to 10 percent of the annualized GHG emissions from the Project. The bulk of these emissions (1.4 to 15 percent) would be from general life cycle analysis studies and do not reflect project-specific information.

As previously indicated, the calculations and results presented in the LCA are estimates and are used only for a general comparison to the overall GHG emissions estimated for the Project. LCA emissions vary based on input assumptions and assessment boundaries (e.g., how far back to trace the origin of a material). Assumptions made in the GHG report are generally conservative.

However, due to the open-ended nature of LCAs, and to the fact that literature evaluation, not site-specific studies, was used to analyze the embodied energy, the analysis should be considered to yield highly uncertain results. Additionally, the analysis likely double-counts emissions from other industry sectors.

Long-Term (Operational) Impacts

Long-term operational or annual emissions from the development of this Project include indirect GHG emissions from electricity use in residential and non-residential buildings and emissions from natural gas combustion used in residential and non-residential buildings, mobile sources, municipal sources, area sources, transit services, and waste disposal. Table III.S-3 (Project Annual GHG Emissions) lists the emissions for each of these categories.

Residential Building Emissions

Residential buildings include various types of condos, townhomes, and other multi-family homes of various sizes. The amount of energy and, therefore, the amount of associated GHG emissions emitted per dwelling unit would vary with the type of residential building. Accordingly, information on the type of residential buildings that are planned for the Project is required to estimate GHG emissions.

GHGs are emitted as a result of activities in residential buildings when electricity and natural gas are used as energy sources. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; when this occurs in a residential building, it is a direct emission source[1170] associated with that building. GHGs are also emitted during the generation of electricity from fossil fuels. When electricity is used in a residential building, the electricity generation typically takes place off site at the power plant; electricity use in a residential building generally causes indirect emissions of GHGs.

While fuel combustion generates CH_4 and N_2O, the emissions of these GHGs typically comprise less than 1 percent of CO_2e emissions from electricity generation and natural gas consumption[1171]. Fuel oil, kerosene, liquefied petroleum gas, and wood can also be used as fuels, but would likely contribute only in small amounts as combustion sources within residential buildings. Wood burning hearths are addressed in the area sources section below. For direct emission of GHGs used in fuel combustion in residential buildings, CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions.

[1170] California Climate Action Registry (CCAR) General Reporting Protocol (GRP), Version 3.1 (January). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January 2009.pdf, Chapter 8.
[1171] Ibid. Tables C2 and C3. The methane and nitrous oxide emission factors are negligible compared to the total CO_2 emission factor for electricity generation in California.

Energy use in residential buildings is divided into (1) energy consumed by the built environment, and (2) energy consumed by uses that are independent of the construction of the building, such as plug-in appliances. In California, Title 24 governs energy consumed by the built environment, including the HVAC system, water heating, and some fixed lighting. Non-building or 'plug-in' energy use can be further subdivided by specific end-uses (refrigeration, cooking, lighting, etc.).

Energy use for each residential dwelling unit was calculated separately based on data in the CEC-commissioned California Statewide Residential Appliance Saturation Survey for climate zone 5. The energy use for Title 24 regulated systems has been adjusted to account for updates in Title 24 standards based on CEC impact analysis reports. The energy use associated with refrigerators, dishwashers, and clothes washers has been adjusted to account for reduction in energy use associated with ENERGY STAR appliances that would be required if installed by the builder. The resulting energy use quantities were then converted to GHG emissions by multiplying by the appropriate emission factors, incorporating information on local electricity production. All indirect electricity emission factors used for the Project are based on the most recent, 2007, PG&E Power/Utility Reporting Protocol report and have been adjusted to incorporate the 20 percent Renewable Portfolio Standard required by 2010. The Project would replace 256 dwelling units of existing housing at Alice Griffith with new housing; this replacement housing would not be net new and is, therefore, not considered in the GHG emissions inventory. The net Project-related residential GHG emissions would have 19,035 tonnes for Candlestick Point and 6,642 tonnes for Hunters Point Shipyard.

Non-Residential Building Emissions

GHG emissions from non-residential buildings include all structures except residences that may exist in this development such as municipal, commercial, retail, and office space. The amount of energy used, and the associated GHG emissions emitted per square foot of available space vary with the type of non-residential building. For example, food stores are far more energy intensive than warehouses, which have little climate-conditioned space. For developments such as this, the exact types of buildings are typically unknown. As such, not all building categories that may be built as part of the Project are represented below. However, the analysis accounts for all of the non-residential building area. The general types of non-residential buildings analyzed include office space, retail buildings, research and development space, artist studios, community services, hotel, stadium, and performance venue.

Similar to the case for residential buildings, GHGs are emitted as a result of activities in nonresidential buildings for which electricity and natural gas are used as energy sources. While fuel combustion generates CH_4 and N_2O, the emissions of these GHGs typically comprise less than 1 percent of CO_2e emissions from natural gas consumption. Fuel oil, kerosene, liquefied petroleum gas, and wood can also be used as fuels, but generally contribute only in small amounts as combustion sources within non-residential buildings. As such, these minor emissions are not accounted for here.

Similar to energy use in residential buildings, energy use in non-residential buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as plug-in appliances. First, the energy use from systems covered by Title 24 (HVAC system, water heating system, and the lighting system) were estimated. Then, energy use from office equipment, plug-in lighting, and other sources not covered by Title 24 were estimated.

Energy use was estimated using the California Commercial End-Use Survey (CEUS) for all building types except for the Stadium. The Stadium energy use was estimated assuming that the new Stadium would be 20 percent more efficient than the energy use reported in the SFCAP for 1990. This is based on the estimate of energy use savings for other NFL stadiums that have recently been replaced.

The resulting emissions were then estimated as the product of the estimated energy use and the appropriate emission factors obtained by incorporating information on local electricity production. All indirect electricity emission factors used for the Project are based on the most recent, 2007, PG&E Power/Utility Reporting Protocol report and have been adjusted to incorporate the 20 percent Renewable Portfolio Standard required by 2010.

The non-residential related GHG emissions for the Project would be 4,263 tonnes CO_2e per year for Candlestick Point and 13,766 tonnes CO_2e per year for Hunters Point Shipyard.

Area Source Emissions

Area source emissions stem from hearths (including gas fireplaces, wood-burning fireplaces, and wood-burning stoves) and small mobile fuel combustion sources such as lawnmowers. Fuel combustion associated with these sources produce direct GHG emissions. Since all of the housing units are multi-family, URBEMIS does not estimate a significant amount of emissions from lawn maintenance equipment and these have not been quantified. Since emissions from natural gas-fired stoves and natural gas heating are already included in the residential sources, calculations based on the URBEMIS method for the remaining types of area sources, natural gas fireplaces was performed.

The Project would have natural gas fireplaces in up to 10 percent of net new residential units. Wood-burning stoves or fireplaces would be prohibited. Direct GHG emissions from these sources were estimated by multiplying the energy use per year by the CO_2 emission factor for natural gas combustion. Annual energy use was determined by the number of fireplaces, the average energy use of each fireplace, and the URBEMIS default fireplace usage rate value of 200 hours/year. An estimated 217 tonnes CO_2 would be generated annually by fuel combustion in natural-gas fireplaces.

Municipal Source Emissions

Municipal sources of GHG emissions that were analyzed as part of the GHG inventory include drinking water and wastewater supply and treatment, lighting in public areas, and municipal vehicles. In general, the majority of municipal sector GHG emissions are related to the energy used to convey, treat, and distribute water and wastewater. Thus, these emissions are generally indirect emissions from the production of electricity to power these systems. Additional emissions from wastewater treatment include CH_4 and N_2O, which are emitted directly from the wastewater.

The amount of electricity required to treat and supply water depends on the volume of water involved. According to the Water Supply Assessment, the Project would generate a total water demand of 1.67 million gallons per day (mgd).[1172]

[1172] Arup. 2009. Candlestick Point–Hunters Point Shipyard Phase II Water Demand Memorandum. September.

Three processes are necessary to supply potable water to residential and commercial users: (1) supply and conveyance of the water from the source; (2) treatment of the water to potable standards; and (3) distribution of the water to individual users. Indirect emissions resulting from electricity use were determined by multiplying electricity use by the CO_2 emission factor provided by the local electricity supplier, PG&E. All indirect electricity emission factors used for the Project are based on the most recent PG&E Power/Utility Protocol report and have been adjusted to incorporate the 20 percent Renewable Portfolio Standard required by 2010. Energy use for different aspects of water treatment (e.g., source water pumping and conveyance, water treatment, distribution to users) was determined using the stated volume of water and energy intensities values (i.e., energy use per unit volume of water) provided by reports from various sources related to San Francisco's water supply system.

Emissions associated with wastewater treatment include indirect emissions necessary to power the treatment process and direct emissions from degradation of organic material in the wastewater. Wastewater treatment direct emissions in the Project are estimated to account for zero tonnes of CO_2e emissions per year since all methane emissions from the wastewater at the Southeast Wastewater Treatment Plant is burned at the flare station or cogeneration plant and non-methane emissions are directly emitted from the wastewater as directed by the plant's air permit.

Indirect GHG emissions from the electricity necessary to power the wastewater treatment process were calculated for the Project. Wastewater in San Francisco would be treated at the Southeast Pollution Control Plant. The electricity required to operate wastewater treatment plant is estimated to be 1,688 kWh per acre foot (AF). Based on the expected amount of wastewater requiring treatment,[1173] this energy intensity factor and the PG&E carbon-intensity factor adjusted to account for the Renewable Portfolio Standard (RPS) were used to calculate the indirect GHG emissions associated with wastewater treatment.

Lighting sources contribute to GHG emissions indirectly, via the production of the electricity that powers these lights. Lighting sources considered in this source category include streetlights, traffic signals, area lighting for parks and lots, and lighting in public buildings. Data from a report by the City of Duluth shows that the amount of electricity demanded for all types of public lighting is 149 kWh per capita per year.[1174] The Project would use energy efficient street lighting. This would reduce street lighting electricity demand by 16 percent.[1175] Using this study, the PG&E-specific carbon-intensity emission factor adjusted for 20 percent RPS and the expected Project population of 23,869, emissions from public lighting were calculated.[1176] This number is likely a conservative estimate since the Project is a master-planned compact community may require a lower number of lights than the City of Duluth.

GHG emissions from municipal vehicles are due to direct emissions from the burning of fossil fuels. Municipal vehicles considered in this source category include vehicles such as police cars, fire trucks, and garbage trucks. Data from reports by Medford, MA; Duluth, MN; Northampton, MA; and Santa Rosa,

[1173] Assumed 91 percent of the water treated is to be reclaimed.
[1174] Skoog., C. 2001. This factor was calculated by summing the total electricity needs for municipal uses and dividing by the Duluth population. The Duluth population was calculated by dividing the city's reported GHG emissions by its reported per capita emissions.
[1175] The resultant energy savings is calculated from the annual energy costs found on page 4 of NYSERDA's 2002 How-to Guide to Effective Energy-Efficient Street Lighting.
[1176] Population estimate provided by Lennar Urban.

California[1177] show that the CO_2 emissions from municipal vehicles would be approximately[1178] 0.05 tonnes per capita per year. Using these studies and the expected Project population of 23,869, emissions from municipal vehicles in the Project were calculated.

In total, all municipal sources including water, wastewater, public lighting, and municipal vehicles for the Project is expected to produce 2,559 tonnes of CO_2e annually.

Solid Waste Disposal Emissions

The residential and non-residential uses at the development would generate waste. A large percentage of this waste would be diverted from landfills either by waste generation reduction, recycling, and composting. San Francisco currently diverts a large portion of its waste generated and has goals to even further reduce the amount of waste sent to a landfill. The remainder of the waste not diverted would be disposed of at a landfill. Landfills emit GHG emissions associated with the anaerobic breakdown of material. The waste disposal rates for the various land uses at the development were estimated based on values reported by the Center for Integrated Waste Management Board (CIWMB).[1179] If no waste disposal rates could be found, waste generation rates for that land use were used. These are likely over-estimates since they do not account for the waste that would be diverted from a landfill. The waste disposal rates were multiplied by the non-biogenic emissions associated with the Altamont Landfill in 2005 which is 0.00674 tonnes of CO_2e emissions per metric ton of waste per year.[1180] The total GHG emissions are anticipated to be 907tonnes CO_2e per year for the Project. These estimates are likely conservative given the fact that future residents would be more conscious of waste and the aggressive goals for waste reduction in San Francisco. In addition, this estimate does not account for the carbon sequestration that would occur as a result of disposal of carbon in the landfill that would not degrade.

Mobile Source (Vehicle) Emissions

The Project mobile source emissions considered for this Project would result from the typical daily operation of motor vehicles by residents and non-residents. ENVIRON estimated GHG emissions based upon all miles traveled associated with net new residential and non-residential trips regardless of internal or external destinations or purpose of trip. Traffic patterns, trip rates, and trip lengths are based upon information from the Candlestick Point–Hunters Point Phase II Development Plan Transportation Study

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[1177] City of Medford. 2001. *Climate Action Plan*. October. http://www.massclimateaction.org/pdf/MedfordPlan2001.pdf.
City of Northampton. 2006. Greenhouse Gas Emissions Inventory. Cities for Climate Protection Campaign. June. http://www.northamptonma.gov/uploads/listWidget/3208/NorthamptonInventoryClimateProtection.pdf.
City of Santa Rosa. Cities for Climate Protection: Santa Rosa. http://ci.santa-rosa.ca.us/City_Hall/City_Manager/CCPFinalReport.pdf.
Skoog., C. 2001. Greenhouse Gas Inventory and Forecast Report. City of Duluth Facilities Management and the International Council for Local Environmental Initiatives.
October.http://www.ci.duluth.mn.us/city/information/ccp/GHGEmissions.pdf.

[1178] In an effort to be conservative, the largest per capita number from these four reports was used.

[1179] CIWMB. 1999. Statewide Waste Characterization Study: Results and Final Report. 340-00-009. http://www.ciwmb.ca.gov/wastechar/Redisp.htm.
CIWMB. 2007. Estimated Solid Waste Generation Rates for Industrial Establishments. http://www.ciwmb.ca.gov/WasteChar/wasteGenRates/Industrial.htm.
CIWMB. 2006. Targeted Statewide Waste Characterization Study: Waste Disposal and Diversion Findings for Selected Industry Groups. 341-06-006. http://www.ciwmb.ca.gov/WasteChar/WasteStudies.htm#2006Industry.

[1180] Based on information provided by BAAQMD.

(Transportation Study).[1181] For mobile sources, CH_4 and N_2O are explicitly calculated, multiplied by their respective GWP, and added to the CO_2 emissions, to result in total CO_2e emissions from mobile sources.

The Transportation Study included an estimate of the trip rates incorporating the Project design features. Consistent with one of the options in the OPR Guidance, this section discusses a comparison of Project emissions with the goals of AB 32. Since the 49ers Stadium would replace Candlestick Park, this is not considered to cause new trips from far away. If the Stadium is not built at HPS, it is assumed that a new Stadium would be built elsewhere in the Bay Area and it is unknown if the trips would be shorter or longer for attendees.

The trips and VMT calculated includes all trips and VMT generated by net new Project residential and non-residential land uses. Once the number of trips is determined, the trip type is important. For example, a home based work (HBW) trip is a trip directly from home to work with no stops in-between, or directly from work to home. A home based shopping trip (HBS) is a trip directly from home to shopping or from shopping to home. A home based other trip (HBO) is a trip directly from home to another destination such as school. Non-home based (NHB) trips are trips between work and other types of destinations such as going to the bank during one's lunch hour. For all trip types, directionality is unimportant. The distribution of residential trip types follows the MTC 2030 model defaults.

Since the trip rates are based on weekday conditions, ENVIRON calculated weekend traffic by applying differences between the weekend and the weekday traffic based upon a report by Sonoma Technologies.[1182] Weekend traffic on major highways was assumed to be 80 percent of the weekly capacity, and weekend traffic on small streets was assumed to be 80 percent of weekly capacity.[1183] No adjustment to driving patterns was done for the music venue since this is on a per event basis. The Transportation Study made an estimate of the total number of vehicle trips taking into account use of several alternative modes including public transit, bicycles, and carpooling.

Each type of trip is associated with an average trip length as estimated by Fehr and Peers based on the Caltrans Household Travel Survey for San Francisco County. Total vehicle miles traveled (VMT) were calculated by multiplying the number of trips by the average trip length for each type of trip. The total VMT for Project residents and non-residents is 309,166,932.

The CO_2 emissions from mobile sources were calculated with the trip rates, trip lengths, and emission factors for running and starting emissions from EMFAC2007. EMFAC emission factors from the year 2020 were used based on San Francisco County fleet mix and adjusted to account for Pavley Vehicle Standards. Nitrous oxide, CH_4, and HFCs[1184] are also emitted from mobile sources. The USEPA recommends assuming that CH_4, N_2O, and HFCs account for 5 percent of mobile source GHG emissions, taking into account their GWPs.[1185] Therefore, CO_2 emissions were divided by 0.95 to account for non-CO_2 GHGs.

[1181] CHS Consulting Group, Fehr and Peers, and LCW Consulting. 2009. *Bayview Waterfront Project Transportation Study*.
[1182] Sonoma Technologies, Inc. 2004. *Correction and Analysis of Weekend/Weekday Emissions Activity Data in the South Coast Air Basin*. May.
[1183] A conservative adjustment for weekend travel was assumed for all the trips since information was not available to distinguish between trips on major highways and trips on small streets. The Sonoma Technologies report gives a range of values, but does not present a weighted value, thus a conservative percent reduction in the number of trips was selected.
[1184] HFCs can be emitted from air conditioning systems.
[1185] USEPA. 2005. *Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle*. Office of Transportation and Air Quality. February. (http://www.epa.gov/otaq/climate/420f05004.pdf)

Vehicles associated with the Project would emit approximately 105,520 tonnes CO_2e per year. In an effort to evaluate the assumptions described in the section, the changes in estimated fleet distribution and emission factors would likely improve based on anticipated regulations, over and above those currently enacted in law.

Transit Service GHG Emissions

Emissions from the transit area are associated with increased public transport needed to serve the Project. GHGs are emitted from public buses when the vehicles are in transit and when the vehicles are idling at the curbside. The emissions are based on the net new miles and trips made by transit servicing the Project. The details of the net new transit service were provided by Fehr and Peers. Since San Francisco uses carbon free electricity to power its electric buses and trolleys, the mileage and idling time from these vehicles is not quantified. Total running emissions from transit buses were calculated by multiplying the net new miles and idling time by the GHG emission factors for urban buses. The diesel buses would be diesel-hybrid buses that reduce fuel usage by 25 percent[1186] and San Francisco transit buses use B20 (20 percent biodiesel, 80 percent petroleum diesel).[1187] The USEPA recommends assuming that CH_4, N_2O, and HFCs account for 5 percent of GHG emissions from on-road vehicles, taking into account their GWPs.[1188] To incorporate these additional GHGs into the calculations, the total GHG footprint was calculated by dividing the CO_2 emissions by 0.95.

The total amount of GHG emissions from the transit service is estimated to be 1,730 tonnes of CO_2 per year.

Total Annual Project CO_2 Emissions

As shown in Table III.S-3 (Project Annual GHG Emissions), using all the emission source categories quantified above, the total annual GHG emissions generated from the Project with the design features related to vehicular use is approximately 154,639 tonnes CO_2e per year. The table reveals that the majority of annual Project emissions is the result of vehicle use (68 percent), followed by residential energy consumption (17 percent).

Several emissions sources were not quantified in this inventory, due to their estimated relatively small[1189] contribution to GHG emissions (typically less than 1 percent based upon previous studies). These sources include emissions from recreational sources and refrigeration leaks, which are described in more detail below.[1190] The Project includes neighborhood community areas and parks, which may also include recreation centers. The precise uses in the neighborhood community areas are not known at this time. . As a result of this uncertainty, the GHG inventory prepared for the Project did not quantify these emissions at this time. Emissions associated with leaks of high global warming potential gases such as from refrigeration leaks were not quantified. At the entitlement stage of development, the degree of uncertainty in the potential facilities with sources that may have refrigeration leaks make a meaningful quantification

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1186 *SFMTA Climate Action Plan*. Draft for Public Review, December 19, 2008.
1187 Based on CCAR recommendations, emissions from burning biodiesel are not included in emissions estimation. EMFAC emission factors are further reduced by 20 percent to account for the use of B20.
1188 USEPA. 2005. *Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle.* Office of Transportation and Air Quality. February.
1189 Typically, less than 1 percent of the overall inventory based upon previous studies.
1190 Black carbon was also not considered. Major sources of black carbon emissions are not present at the Project.

of GHG emissions difficult. In addition, since refrigeration systems would be new, they are likely efficient and should be designed to reduce the amount of leaks of high global warming potential gases.

Table III.S-3 Project Annual GHG Emissions

Source	*Candlestick Point (tonnes CO_2e/year)*	*Hunters Point Shipyard Phase II (tonnes CO_2e/year)*	*Total (tonnes CO_2e/year)*
Residential	19,035	6,642	25,677
Non-Residential	4,263	13,766	18,029
Mobile	75,149	30,371	105,520
Municipal	1,793	766	2,559
Area	161	56	217
Waste	532	375	907
Transit Area	865	865	1,730
Total (annual emissions)	***101,798***	***52,841***	***154,639***

SOURCE: ENVIRON, 2009.

III.S.5 Impacts

Significance Criteria

The City and County of San Francisco has not formally adopted significance standards for climate change impacts but generally considers that implementation of a project would have a significant GHG impact if it were to:

S.a Conflict with the state goal of reducing GHG emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32 (*California Global Warming Solutions Act of 2006*), such that the project's GHG emissions would result in a substantial contribution to global climate change

S.b Conflict with San Francisco's *Climate Action Plan* such that it would impede implementation of the local GHG reduction goals established by the 2008 Greenhouse Gas Reduction Ordinance

Analytic Method

The release of GHGs in general and CO_2 specifically into the atmosphere is not of itself an adverse environmental effect. It is the effect that increased concentrations of GHG concentrations of GHG including CO_2 in the atmosphere has upon the earth's climate (i.e., climate change) and the associated consequences of climate change that results in adverse environmental effects (e.g., sea level rise, loss of snowpack, severe weather events). Although emissions modeling can estimate a project's incremental contribution of CO_2 into the atmosphere, it is not feasible to determine whether or how an individual project's relatively small incremental contribution (on a global scale) might translate into physical effects on the environment. Because Earth's climate is determined by the complex interaction of different components of Earth and its atmosphere, it is not possible to discern whether the presence or absence of GHG emitted by the Project would result in any measurable impact that would intensify climate change or its adverse environmental impacts.

No state, local, or the applicable regional air quality agency has adopted a methodology or quantitative threshold that can be applied to a specific development or construction project to evaluate the significance of an individual project's contribution. Therefore, this analysis considers GHG emissions from the Project against the anticipated GHG emissions assuming regulations consistent with ARB's Scoping Plan 2020 estimate of a No Action Taken scenario. This compares the Project GHG emission inventory to the GHG emissions that would occur from a community that would be built today without Project design features and energy reduction commitments made by Project Applicant. This baseline comparison is referred to as No Action Taken (NAT), which follows the regulations considered by ARB in developing its 2020 No Action Taken estimate as part of the Scoping Plan. This represents the GHG emission inventory if things were continued to be built according to current standards in place at the time of the Scoping Plan. In addition, this analysis considers GHG emissions from Project implementation in relation to total GHG emissions in the Bay Area and California. It also considers steps that California intends to take to reduce GHG emissions and actions the City and County of San Francisco is taking to reduce GHG emissions, including the City's Climate Action Plan and 2008 Greenhouse Gas Reduction Ordinance.

The state Office of Planning and Research (OPR) published informal guidance regarding the steps lead agencies should take to address climate change in their CEQA documents.[1191] According to the OPR, lead agencies should determine whether GHGs may be generated by a project, and if so, quantify or estimate the GHG emissions by type and source. The lead agency must assess whether those emissions are individually and/or cumulatively significant. When assessing whether a project's effects on climate change are "cumulatively considerable" even though its GHG contribution may be individually limited, the lead agency must consider the impact of the project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the lead agency determines that the GHG emissions from the project as proposed are potentially significant, it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions.

As stated above in Section III.S.3, the BAAQMD has not adopted quantitative thresholds of significance for construction-related emissions. However, the BAAQMD is developing quantitative CEQA significance thresholds for construction- and operations-related emissions of criteria pollutants, precursors, TACS, and GHGs.[1192] The BAAQMD expects to adopt these new thresholds of significance later this year. Therefore, in anticipation of the BAAQMD's future adoption of new quantitative significance thresholds for operations-related emissions, the Draft EIR also includes a quantitative analysis of the Project's construction- and operations-related emissions based on the draft BAAQMD significance thresholds regarding the Project's operational emissions.

[1191] State of California, Governor's Office of Planning and Research, *CEQA and Climate Change: Addressing Climate Change through California Environmental Climate Act (CEQA) Review*, June 19, 2008 (hereinafter "OPR Advisory").
[1192] BAAQMD. 2009. *Revised Draft Options and Justification Report California Environmental Quality Act Thresholds of Significance.* October.

Project Impacts

Impact GC-1: Conflict with GHG Emissions Goals

Impact GC-1 **The Project would not result in a substantial contribution to global climate change by increasing GHG emissions in a manner that conflicts with the state goal of reducing GHG emissions in California to 1990 levels by 2020 (e.g., a substantial contribution to global climate change) or conflicts with San Francisco's Climate Action Plan by impeding implementation of the local GHG reduction goals established by the San Francisco 2008 Greenhouse Gas Reduction Ordinance. (Less than Significant with Mitigation)** ***[Criteria S.a and S.b]***

As explained previously, the analysis of Project emissions in the GHG emission inventory assumed certain Project features. The land use mixes and basic land plan design proposed in the Project Description are fundamental aspects of the Project and include certain features assumed in the GHG emissions inventory, including providing neighborhood-serving retail; providing automobile, public transportation and pedestrian connections between the Shipyard, Candlestick Point, and the larger Bayview neighborhood; providing for transportation and open space corridors; and integrating land use patterns with a multimodal street network that facilitates walking and cycling for internal trips and transit for trips of greater distance. Other Project features assumed in the GHG emission inventory are more conceptual, such as landscape plans and plans related to energy efficiencies in building design. Further, transportation features proposed as part of the Project that would be implemented in part by SFMTA are identified in Section III.D (Transportation and Circulation) as mitigation measures. Because some of the Project features are conceptual, and other Project features are identified elsewhere in the document as mitigation measures, this section identifies mitigation measures MM GC-1 through MM GC-4 as measures that also would be needed to ensure that the reductions considered in developing the GHG emission inventory take place as residential and employment-generating uses are developed.

Because the development plan is conceptual, and there could be modifications during the entitlement and development process, mitigation measures MM GC-1 through MM GC-4 would be implemented to ensure that the reductions considered in developing the GHG emission inventory take place as residential and employment-generating uses are developed.

MM GC-1 *Plant up to 10,000 trees net new trees at the Project site and in the community.*

MM GC-2 *Exceed the 2008 Standards for Title 24 Part 6 energy efficiency standards for homes and businesses would by at least 15 percent.*

MM GC-3 *Install ENERGY STAR appliances, where appliances are offered by homebuilders*

MM GC-4 *Use light emitting diode (LED) based energy efficient street lighting.*

Implementation of mitigation measures MM GC-1 through MM GC-4 would ensure that adequate GHG emission reductions are provided as residential and employment-generating uses are constructed and occupied. Impacts related to climate change and GHG emissions for the operational phase of the development would be less than significant.

Construction impacts

The Project's GHG emissions from construction-related activities and changes in vegetation sequestration would be short-term and would only occur once unlike operational emissions that would continue for the duration of the Project. Since the Project is predicted to result in a net sequestration of carbon due to vegetation as compared to the existing condition, GHG emissions associated with vegetation changes is not an adverse impact. Table III.S-2 summarizes the modeled Project-generated, construction-related GHG emissions. These emissions would contribute to regional increases in GHG emissions and associated climate change effects.

Implementation of the Project would result in a total of 105,587 tonnes of CO_2e of construction-related activities over the 16 years of construction activities. Over the construction time period, the construction-related GHG emissions average 6,600 tonnes per year. The statewide annual GHG inventory (2004) is estimated at 479,740,000 tonnes. For context purposes, the average annual construction emissions would represent 0.0014 percent of the statewide total emissions for a year. The Bay Area Greenhouse Gas Emission Inventory Projections indicate that the 2007 inventory of 102,552,991 tonnes of CO_2e has approximately 1.7 percent of these emissions are attributable to construction equipment emissions, 1.8 million metric tonnes and would continue to account for about the same proportion into the future. The estimated annual average construction-related emissions for the Project represent less than one percent of the construction equipment emissions for the Bay Area.

Existing ARB regulations (Title 13 of the CCR, Section 2480 and 2485), which limit idling of diesel-fueled commercial motor vehicles, would help to limit GHG emissions associated with construction-related vehicles. In addition, the ARB's proposed Early Action Measures (EAMs) (pursuant to the *California Global Warming Solutions Act of 2006*) include other emission reduction measures for diesel trucks and diesel off-road equipment. The ARB is expected to review and adopt the EAMs by January 1, 2010, so equipment used for construction of the Project after 2010 could be subject to these requirements. Subsequent to the release of the proposed EAMs, the ARB developed the AB 32 Scoping Plan outlining the state's strategy to achieve AB 32's 2020 GHG emissions limit. Once measures from the EAM and Scoping Plan go into effect, construction contractors on the projects would be subject to these requirements, and the Project would implement these measures as required; emission from Project construction activities would be reduced accordingly.

Given the requirements of ARB's scoping plan and EAMs that would apply to construction contractors, these emissions are less than significant for the cumulative impact to climate change because the Project would not conflict with state goals or the SFCAP.

Operational Emissions

Operation of the Project would result in GHG emissions from building energy use, mobile sources, area sources, energy associated with water usage, and solid waste disposal. Table III.S-3 summarizes the modeled Project- related GHG emissions. These emissions would contribute to regional increases in GHG emissions and associated climate change effects.

Implementation of the Project would result in a total of 154,639 tonnes CO_2e per year. For context purposes, the Bay Area Greenhouse Gas Emission Inventory Projections indicate that annual emissions in the San Francisco Bay Area Air Basin are 102,552,991 tonnes per year. The Project would represent 0.15

percent of the Bay Area GHG emissions. Based on the current statewide inventory (2004) of 479,740,000, the Project annual operational emissions would represent 0.0322 percent of the statewide total emissions.

The Scoping Plan outlines various actions the State could take to reduce GHG emissions across various emission source categories. One area of this is building energy efficiency through improvements in building codes and implementation of green building ordinances. With mitigation, when residential buildings are considered, compared to the 2005 Title 24 building code basis used in the Scoping Plan, the Project's residential GHG emissions would be 20 percent better than the ARB Scoping Plan No Action Taken scenario. Table III.S-4 (Annual GHG Emissions Comparison of Project and ARB Scoping Plan No Action Taken Scenario) shows the ARB Scoping Plan No Action Taken Scenario estimates as well as the Project GHG emissions for comparison purposes. Similarly, its commercial buildings would result in 18 percent reduction in GHG emissions due to energy efficiency measures. Another area is transportation related emissions.

Table III.S-4 Annual GHG Emissions Comparison of Project and ARB Scoping Plan No Action Taken Scenario

Source	*No Action Taken*	*Project*	*Difference*	*Percent Difference*
Residential	32,286	25,677	6,609	20%
Non-Residential	21,863	18,028	3,835	18%
Mobile	258,330	105,520	152,810	59%
Municipal	2,756	2,559	197	7%
Area	217	217	0	0%
Waste	907	907	0	0%
Transit Service	2,884	1,730	1154	40%
Total	***319,243***	***154,638***	***164,605***	***52%***

SOURCE: ENVIRON, 2009.

Several measures in the Scoping Plan are aimed at reducing transportation related emissions including SB 375 which encourages regional transportation planning, vehicle fuel efficiency measures, transit oriented development, mixed-use of land, and urban infill development projects. Consistent with several of these strategies, the Project transportation-related emissions represent a 59 percent reduction in GHG emissions from the ARB Scoping Plan No Action Taken scenario, as shown in Table III.S-4. Transit vehicle emissions would be 40 percent lower due to the use of diesel hybrid buses as shown in Table III.S-4.

Reduction in the carbon-intensity of the electricity supply through implementation of renewable portfolio standards would impact the GHG emissions associated with not only buildings, but also the GHG emissions attributable to the embedded energy in water. Through water efficiency, efficient street lighting, and improved energy carbon intensity, the municipal sources would result in the 7 percent reduction in emissions compared to the regulations assumed in the ARB Scoping Plan No Action Taken scenario as shown in Table III.S-4. These reductions for all of the major operational categories are large and result in a total of 52 percent reduction in GHG emissions as compared to the ARB Scoping Plan No Action Taken scenario and show the progress this Project is making in reducing GHG emissions.

Furthermore, the City and County of San Francisco has additional regulations and ordinances that would help to limit GHG emissions associated with Project-related operational emissions. These include the green building ordinance, greenhouse gas reduction ordinance, "transit first" policy, and bicycle plan. All of these measures would serve to reduce Project-related GHG emissions. In addition the Project Applicant is committed to several mitigation measures included in the GHG emission inventory analysis that reduce GHG emissions.

Given the Project design as a dense, infill mixed-use project, with a transit-oriented design, the mitigation measures identified previously, the Project's large reductions in GHG emissions as compared to the ARB Scoping Plan No Action Taken scenario, and the continuing implementation of GHG reduction actions by the City and County of San Francisco, the Project would not conflict with the state's goals of reducing GHG emissions to 1990 levels by 2020, or the City's GHG reduction goals established in the Greenhouse Gas Reduction Ordinance, and would not result in a significant cumulative impact.

BAAQMD Draft GHG Thresholds

As discussed above, BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2, which would apply to mixed-use projects, such as this, is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year.

In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized.

The BAAQMD also suggested some guidance on how to prepare a GHG emission inventory. For operational emissions, the BAAQMD suggests quantifying residential, non-residential, mobile, water, and area sources. The guidance recommends generalized values for energy use for various land use types and generalized emission factors which don't account for local electricity emission factors or newer vehicle efficiency regulations. The operational emissions estimated for the Project would include additional source categories not included in the BAAQMD proposed methodology for quantifying GHG operational emissions. These additional source categories include solid waste disposal and transit services. The exclusion of these sources from the inventory would likely lower the operational emissions per service population. The operational emissions estimated for the Project utilized different emission factors and methodologies. These include the carbon intensity used for electricity, estimates of building energy use, and vehicle emission factors, which the alteration of these would likely increase the operational emissions per service population based on only changing the carbon intensity emission factor. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change.

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CHAPTER IV **Project Variants**

IV.A INTRODUCTION

This section introduces six variants of the Project that were formulated by the Agency, the City and Lennar Urban. These variants are addressed at a project level of detail in this chapter of this EIR, and include the following:

- Variant 1: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—R&D Variant
- Variant 2: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—Housing Variant
- Variant 2A: San Francisco 49ers move outside the project area (no football stadium constructed at HPS Phase II)—Housing/R&D Variant
- Variant 3 (Tower Variants A, B, C, and D): Four Candlestick Point tower variants would have the same land use program and overall description as with the Project, but would have different locations, massings, and heights for residential towers at Candlestick Point
- Variant 4: A utilities variant would include an automated solid waste collection system, decentralized wastewater treatment, and district energy
- Variant 5: Shared stadium where both the San Francisco 49ers and Oakland Raiders would play at the stadium at HPS Phase II

Three variants (Variants 1, 2, and 2A) address the scenario of the San Francisco 49ers moving to the City of Santa Clara or elsewhere with no football stadium constructed at HPS Phase II. Each of those three variants includes a different land use program at the HPS Phase II site. Variant 1 (R&D Variant) would include increases in R&D space at the stadium location. Variant 2 (Housing Variant) would relocate 1,350 residential units from Candlestick Point to the stadium site. Variant 2A (Housing/R&D Variant) would relocate 1,650 housing units from Candlestick Point to the stadium site, and, in addition, includes an additional 500,000 sf of R&D compared to the Project (for a total of 3,000,000 sf of R&D); 1,000,000 sf of the total R&D for Variant 2A would be constructed on the stadium site along with the residential uses.

The Candlestick Point Tower Variant (Variant 3) would have the same land use program and overall description as the Project, but would have different locations, massings, and heights for residential towers at Candlestick Point (expressed as four options for this variant: Candlestick Point Tower Variants A, B, C, and D).

A Utilities Variant (Variant 4) would include an automated solid waste collection system, decentralized wastewater treatment, and district energy. A 49ers/Raiders Shared Stadium Variant (Variant 5) would include the scenario of a shared stadium, where both the 49ers and Oakland Raiders would play at a new stadium at HPS Phase II.

None of the variants would alter the Project Objectives, which are provided in detail in Chapter II (Project Description) of this EIR. The variants are analyzed at a project level of detail, which is equal to the Project

analysis included in Chapter III (Environmental Setting, Impacts, and Mitigation Measures), Section III.A through Section III.S of this EIR. The environmental impacts that would result from implementation of the variants are presented following the description of each variant. A comparison of the variant development programs to the Project is presented in Table IV-1 (Comparison of Variants to the Project). Table IV-2 (Impact Comparison of Project Variants) summarizes the effects of the Project compared to the variants.

Most of the features of the variants would be similar to the features of the Project. None of the variants would alter the Project Objectives, which are provided in detail in Chapter II (Project Description). The Project could be approved in combination with Variants 3 (Tower Variants A, B, C, and D), 4, and/or 5, any of which can be overlaid on the Project. Variants 1, 2, and 2A represent variants of the Project without a stadium; either of these variants, if approved, could also include components of Variants 3 (Tower Variants A, B, C, and D), 4, and/or 5. For all of these variants, this Chapter IV (Project Variants) provides an environmental analysis such that this EIR would be adequate under CEQA for purposes of review and approval for any of the variants of the Project either individually or in combination with elements of the Project. The variants are analyzed at a project-level of detail, which is equal to the Project analysis included in Chapter III (Environmental Setting, Impacts, and Mitigation Measures) Section III.A through Section III.S of this document. The environmental impacts that would result from implementation of the variants are presented following the description of each variant. A comparison of the variant development programs to the Project is presented in Table IV-1 (Comparison of Variants to the Project). Table IV-2 (Impact Comparison of Project Variants) summarizes the effects of the Project compared to the variants.

Table IV-1 Comparison of Variants to the Project

Differences	*Project*	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2: Housing Variant (No Stadium, Housing)*	*Variant 2A: Housing/ R&D Variant (No Stadium)*	*Variant 3: Candlestick Point Tower Variants (Different Tower Heights and Locations, Larger Floor Plates)*	*Variant 4: Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5: 49ers/Raiders Shared Stadium*
						Same overall development plan as Project, but with minor shifts in building locations to accommodate 570,000 gsf for the proposed utility systems (with 330,000 gsf located below ground).	Same development plan as Project
Land Use Plan							
Residential (units)—Candlestick Point	7,850	7,850	6,500	6,225[a]	7,850	7,850	7,850
Residential (units)—Hunters Point Phase II	2,650	2,650	4,000	4,275[a]	2,650	2,650	2,650
					Same number of residential units, but different placement of towers		
Office	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Research & Development (gsf)	2,500,000	5,000,000	2,500,000	3,000,000	2,500,000	2,500,000	2,500,000
Regional Retail	635,000	635,000	635,000	635,000	635,000	635,000	635,000
Neighborhood Retail	250,000	250,000	250,000	250,000	250,000	250,000	250,000
			Same overall amount of neighborhood retail as Project, but different distribution within HPS Phase II (refer to text for a description)	Same overall amount of neighborhood retail as Project, but different distribution within HPS Phase II (refer to text for a description]			
Tower Floor Plates	10,000 sf	10,000 sf	10,000 sf	10,000 sf	12,500 sf	N/A	N/A
Football Stadium (seats)	69,000 Stadium built by 2017	0	0	0	69,000 Stadium built by 2017	69,000 Stadium built by 2017	69,000 Shared stadium with 49ers and Oakland Raiders Stadium site built by 2017
Yosemite Slough Bridge	Auto/BRT/Ped	BRT/Ped	BRT/Ped	BRT/Ped	Auto/BRT/Ped	Auto/BRT/Ped	Auto/BRT/Ped

Table IV-1 Comparison of Variants to the Project

Differences	*Project*	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2: Housing Variant (No Stadium, Housing)*	*Variant 2A: Housing/ R&D Variant (No Stadium)*	*Variant 3: Candlestick Point Tower Variants (Different Tower Heights and Locations, Larger Floor Plates)*	*Variant 4: Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5: 49ers/Raiders Shared Stadium*
Parks, Open Space, and Recreation Uses							
Total Parks, Open Space, and Recreational Uses	336.4	327.0	349.4	326.6	336.4	336.4	337.5
New Parks	148.1	160.5	158	159	148.1	148.1	148.6
Sports Fields and Active Recreation	91.6	69.8	96.7	70.9	91.6	91.6	91.6
State Parklands (acres)	96.7	96.7	96.7	96.7	96.7	96.7	96.7

SOURCE: Lennar Urban, 2010.

a. The bridge would be open to automobiles only on game days.

Table IV-2 Impact Comparison of Project Variants

		Impacts								
					Variant 3: Candlestick Point Tower Variants					
	Topic	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2:HousingVariant (No Stadium, Housing)*	*Variant 2A: Housing Variant with R&D (No Stadium)*	*Tower Variant 3A*	*Tower Variant 3B*	*Tower Variant 3C*	*Tower Variant 3D*	*Variant 4: Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5: 49ers/ Raiders Shared Stadium*
III.B	Land Use and Plans	=	=	=	=	=	=	=	=	=
III.C	Population, Housing, and Employment	=	=	=	=	=	=	=	=	=
III.D	Transportation and Circulation	>	<	>	=	=	=	=	=	=
III.E	Aesthetics	=	<	<	>	>	>	>	=	=
III.F	Shadows	<	<	<	>	=	<	<	=	=
III.G	Wind	<	<	<	=	=	=	=	=	=
III.H	Air Quality	=	=	=	=	=	=	=	=	=
III.I	Noise	>	<	=	=	=	=	=	=	=
III.J	Cultural Resources and Paleontological Resources	=	=	=	=	=	=	=	=	=
III.K	Hazards and Hazardous Materials	=	=	=	=	=	=	=	=	=
III.L	Geology and Soils	=	=	=	=	=	=	=	=	=
III.M	Hydrology and Water Quality	>	<	=	=	=	=	=	<	=
III.N	Biological Resources	=	=	=	=	=	=	=	=	=
III.O	Public Services	>	<	=	=	=	=	=	=	=
III.P	Recreation	=	=	=	=	=	=	=	=	=
III.Q	Utilities	=	=	=	=	=	=	=	<	=
III.R	Energy	=	=	=	=	=	=	=	=	=
III.S	Greenhouse Gas Emissions	>	=	=	=	=	=	=	=	=

SOURCE: PBS&J, 2009.

Each topic is compared to the Project and for each impact area, impacts are equal to (=), greater than (>), or less than (<) the Project impacts.

IV.B VARIANT 1: R&D VARIANT (NO STADIUM—ADDITIONAL RESEARCH & DEVELOPMENT)

IV.B.1 Overview

The R&D Variant assumes that the 49ers Stadium would not be constructed, and, instead, additional R&D uses emphasizing emerging technologies would be developed at HPS Phase II. Total R&D uses with this Variant would be 5,000,000 gsf, compared to 2,500,000 gsf with the Project and developed on HPS Phase II. The land use program for Candlestick Point would remain the same as the Project. Parks and sports field areas at HPS Phase II would be decreased compared to the Project because the total development area for R&D uses would be increased.

Table IV-3 (R&D Variant Land Use Summary) presents the land use summary for the variant; Table IV-4 (R&D Variant HPS Phase II Proposed Land Use Summary) presents the land use summary on HPS Phase II. Figure IV-1 (R&D Variant Land Use Plan) illustrates proposed R&D Variant land uses.

IV.B.2 Project Objectives

The objectives for the R&D Variant would be the same as for the Project. In particular, the R&D Variant was prepared to address the following portion of Objective 1:

- Implement the CP-HPS Development Plan with public benefits, whether or not the 49ers decide to remain in San Francisco, including developing alternate uses for the stadium site on the Shipyard Property that are consistent with the overall CP-HPS Development Plan objectives.

A full list of Project objectives is provided in Section II.D (Project Objectives).

IV.B.3 Characteristics

Section II.E (Project Characteristics) outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While many of these components of the Project would also apply to this variant, the discussion below outlines the principal differences.

■ Candlestick Point

- The land use program outlined in the Chapter II for Candlestick Point would be the same for the R&D Variant (Variant 1), with fewer housing units.[1193] The discussion below is focused on the changes that would occur at HPS Phase II.

[1193] The number of residential units in each district may be adjusted depending on market demand; however, the sum total of housing units for Candlestick Point would not exceed 7,850 units.

Table IV-3 R&D Variant Land Use Summary

Land Use		*Candlestick Point*[a]	*HPS Phase II*	*Total*
Residential				
Residential Density Range I (15 to 75 units per acre)		750	680	1,430
Residential Density Range II (50 to 125 units per acre)		3,215	1,415	4,630
Residential Density Range III (100 to 175 units per acre)		2,445	265	2,710
Residential Density Range IV (175 to 285 units per acre)		1,440	290	1,730
	Total (units)	***7,850***	***2,650***	***10,500***
Retail				
Regional Retail (gsf)		635,000	N/A	635,000
Neighborhood Retail (gsf)		125,000	125,000	250,000
	Total (gsf)	***760,000***	***125,000***	***885,000***
Office (gsf)		150,000	N/A	150,000
Research & Development		N/A	5,000,000	5,000,000
Hotel (gsf)		150,000	N/A	150,000
Rooms		220	N/A	220
Artists' Studios/Art Center (gsf)		N/A	255,000	255,000
Community Services (gsf)[c]		50,000	50,000	100,000
Parks & Open Space				
New Parks (acres)		8.1	152.4	160.5
New Dual-Use Sports Fields/Multi-Use Lawn and Stadium Parking and Waterfront Recreation (acres)		N/A	69.8	69.8
Existing State Parkland Improved (acres)		91.0	N/A	91.0
New State Parkland (acres)		5.7	N/A	5.7
	Total (acres)	***104.8***	***222.2***[d]	***327.0***
Marina (slips)		N/A	300	300
Performance Venue/Arena (gsf)		75,000	N/A	75,000
Seats		10,000	N/A	10,000
Parking (spaces)				
Residential (structured)		7,850	2,650	10,500
Commercial (structured)		2,346	7,028[f]	9,374
General and Commercial (on-street)		1,360	1,678[f]	3,038

SOURCE: Lennar Urban, 2009.

a. Same as Project.
b. Research and development uses are doubled compared to the Project.
c. Community facilities may be provided that cumulatively exceed 100,000 square feet. If so, the Project contemplates an equal reduction in retail and/or research and development and/or office use. Total uses would not exceed those amounts identified in this table.
d. Parks and sports field areas at HPS Phase II would be reduced compared to the Project because land would not be reserved for dual-use turf, which allows for game day parking and active playing fields.
e. Commercial and on-street parking at HPS Phase II would be increased compared to the Project to provide parking for the additional R&D space.
f. Although there has been consideration of ferry service at HPS-II during the years of planning for this project, at this time there is no plan or specific proposal from the WETA to provide such service. While the development plan for HPS-Phase II, including the design of the shoreline improvements, would not preclude the future accommodation of a ferry terminal and ferry service should WETA decide in the future to propose and pursue such a project, it is not proposed as part of the project studied in this EIR. Any such future proposal by WETA would require a separate environmental review under CEQA.

Table IV-4 R&D Variant HPS Phase II Proposed Land Use Summary

District	*Net Acres*[a]	*Dwelling Units*	*Density*	*Neighborhood Retail (gsf)*	*Artist Space (gsf)*	*R&D (gsf)*	*Community Services (gsf)*	*Total Commercial (gsf)*	*Parks (acres)*
Hunters Point Shipyard North	27.30	2,085	I, II, III, IV	25,000	0	0	0	25,000	19.9
Hunters Point Shipyard Village Center	7.55	125	I	25,000	255,000	0	0	280,000	15.6
Research & Development	26.22	440	I, II	75,000	0	2,000,000	0	2,075,000	25.3
Hunters Point Shipyard South	62.09[b]	0	N/A	0	0	3,000,000	50,000	3,050,000	161.4
Total	***123.16***	***2,650***	***N/A***	***125,000***	***255,000***	***5,000,000***[c]	***50,000***[d]	***5,430,000***[c]	***222.2***[e]

SOURCE: Lennar Urban, 2009.

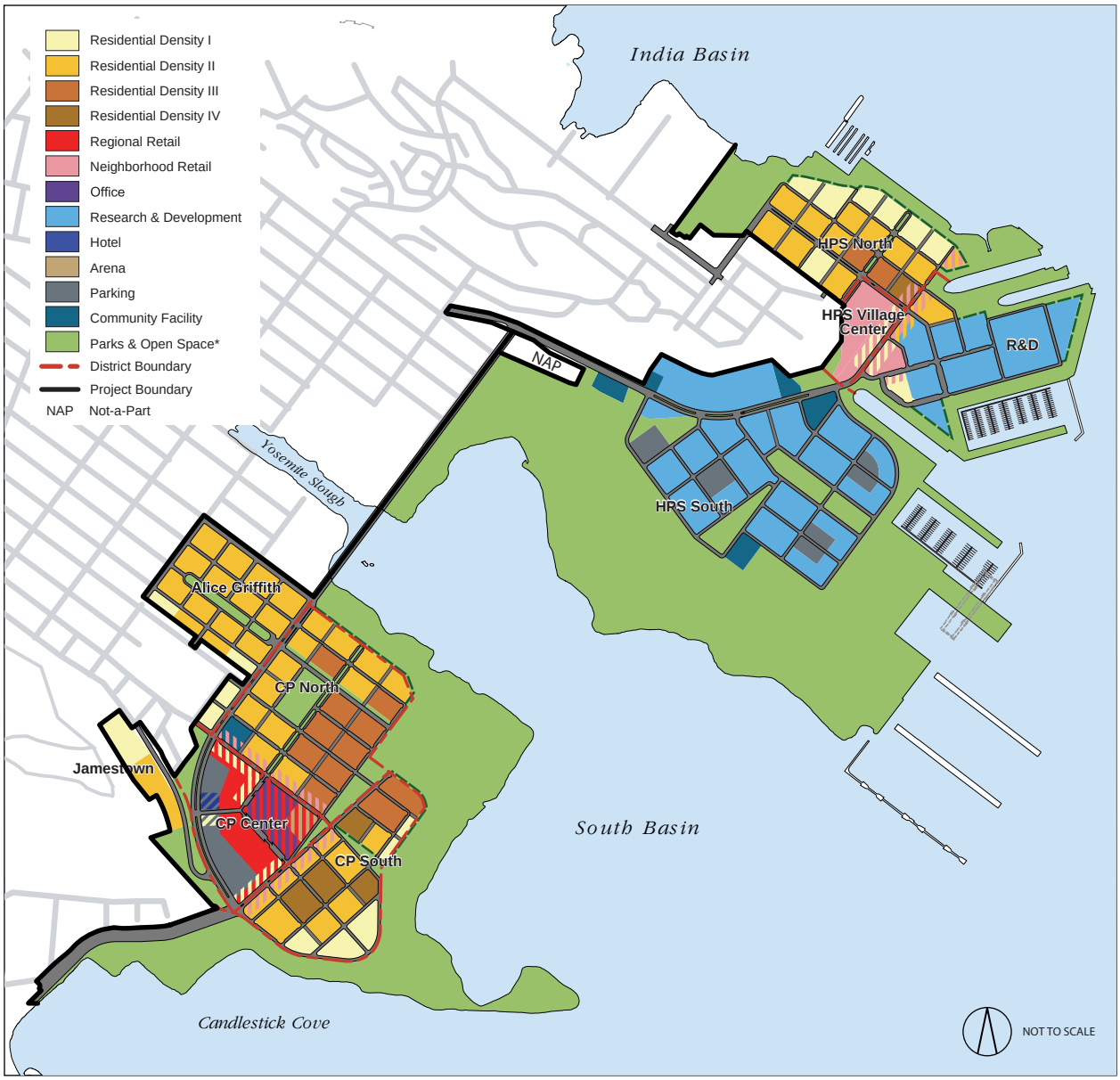
a. Net acreage excludes the street network.

b. The net acreage of the HPS South district would be increased compared to the Project (32.26 acres with stadium).

c. Research and development uses are doubled compared to the Project.

d. Community facilities parcels are intended to provide the existing BVHP community and the future Project community with dedicated land for uses designed to provide, preserve and leverage such critical local resources as social services, education, the arts and other community services, including public safety facilities such as fire and police stations and facilities for the benefit of senior citizens. Additional uses proposed for the community facilities parcels such as retail, services, offices, and R&D space, beyond the 100,000 proposed for community facilities, would be absorbed within the retail or R&D program proposed in HPS Phase II. Total uses would not exceed those amounts identified in this table

e. Parks and sports fields areas at HPS Phase II would be reduced compared to the Project because the total development area for R&D uses would be increased.



SOURCE: Lennar Urban, 2009.

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FIGURE IV-1 Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT LAND USE PLAN

Districts

As discussed in Chapter II, the HPS Phase II land use plan would consist of four districts: HPS Village Center, HPS North, R&D, and HPS South. The changes proposed with the R&D Variant compared to the Project would primarily affect the land use plan for the R&D and HPS South districts. The land uses in all other districts would be consistent with the Project, as described in detail in Chapter II. A summary of the development proposed in each of the districts with the R&D Variant (Variant 1) is provided in Table IV-4.[1194] Figure IV-2 (R&D Variant Maximum Building Heights) illustrates the maximum building heights for the R&D Variant.

Hunters Point Shipyard South

With the R&D Variant, the 69,000-seat National Football League stadium proposed with the Project would not be constructed. Instead, the R&D Variant would result in construction of 3,000,000 gross square feet (gsf) of R&D uses in the HPS South district. Total R&D uses with this Variant would be 5,000,000 gsf, compared to 2,500,000 gsf with the Project. Parking to serve game-day patrons proposed for the R&D development site north of Crisp Road would not be required. As described below, the Sports Field Complex proposed with the R&D Variant would be 40.7 acres (19 acres smaller than the Sports Field Complex proposed with the Project).

Parks and Open Space

The R&D Variant parks and open space on Candlestick Point would be the same as the Project; this discussion focuses on HPS Phase II changes. The R&D Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. The Sports Field Complex proposed with the R&D Variant would be 40.7 acres, which is 19 acres less than the Sports Field Complex proposed with the Project. Approximately 9.4 acres of new parks and plaza spaces are proposed to be located adjacent to the R&D uses. With the R&D Variant, a total of 222.2 acres of parkland would be provided at HPS Phase II, 9.4 acres less than proposed with the Project. Table IV-5 (R&D Variant HPS Phase II Parks and Open Space) presents the proposed parks and open space at HPS Phase II in the R&D Variant. Figure IV-3 (R&D Variant Parks and Open Space) illustrates the location of the proposed parks and open space.

Transportation and Circulation

A new Yosemite Slough bridge serving transit, bike, and pedestrian traffic only would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. The additional four auto lanes on the bridge to serve game-day traffic, proposed with the Project, are not included in the R&D Variant. The bridge would be approximately 40-feet wide and would cross the slough at the same location as the Project. The bridge and its approach streets would have two dedicated transit lanes and a separate Class I bicycle and pedestrian lane, which would be open at all times.

[1194] The number of residential units in each district may be adjusted depending on market demand; however, the sum total of housing units for HPS Phase II would not exceed 2,650 units.

SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT MAXIMUM BUILDING HEIGHTS

FIGURE IV-2

Table IV-5 R&D Variant HPS Phase II Parks and Open Space		
Park/Open Space		***Acres***
New Parks		
Northside Park		12.8
Waterfront Promenade		31.9
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		44.9
Grasslands Ecology Park at Parcel E-2		37.8
Hunters Point Park Blocks		4.5
Hunters Point Wedge Park		2.8
R&D Plaza		2.1
	Subtotal	*152.4*
New Sports Fields and Active Urban Recreation		
Sports Field Complex		40.7
Multi-Use Lawn		22.4
Waterfront Recreation & Event Pier		6.7
	Subtotal	*69.8*
	Total	***222.2***
	Project Total	***239.5***

SOURCE: Lennar Urban, 2009.

The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

At HPS Phase II, additional roadways to serve the R&D uses on HPS South would be included and commercial parking would be increased to serve the additional R&D space, compared to the Project.

Infrastructure

The location of major infrastructure improvements would be very similar to that which is proposed for the Project but rather than terminating at the stadium site, the improvements would be sited under the roadways of the HPS South district. Stormwater treatment methods are designed for site-specific conditions and have been identified for the R&D Variant and are discussed below.[1195]

[1195] Arup, *Candlestick Point/Hunters Point Shipyard LID Stormwater Opportunities Study*, August 2009.

SOURCE: Lennar Urban, RHAA, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT PARKS AND OPEN SPACE

FIGURE IV-3

Implementation

- Build-out of the R&D uses would begin in 2011, with completion in 2031. Figure IV-4 (R&D Variant Building and Park Construction Schedule) illustrates the overall sequence of development for the R&D Variant (Variant 1).

IV.B.4 Potential Environmental Effects

Overall, the R&D Variant would increase the total amount of development compared to the Project due to an increase in R&D space at HPS Phase II by 2,500,000 square feet over the Project and the reduction of a 69,000-seat stadium (approximately 1,860,000 gsf). Generally, the R&D Variant includes all uses proposed with the Project with the exception of the stadium area, which would be replaced by the additional R&D space. All characteristics of Candlestick Point would be the same as the Project; therefore, this analysis focuses on the changes that would occur at HPS Phase II. Potential construction-related environmental effects of the R&D Variant would be primarily related to an increase in the amount of total building space. Potential operational effects of the R&D Variant would be related to the day-to-day activities of the additional R&D space, which operates much like office use with increases in traffic, while avoiding the game-day traffic that would occur 12 times a year, and other event traffic that would occur 20 times a year, with a 49ers stadium.

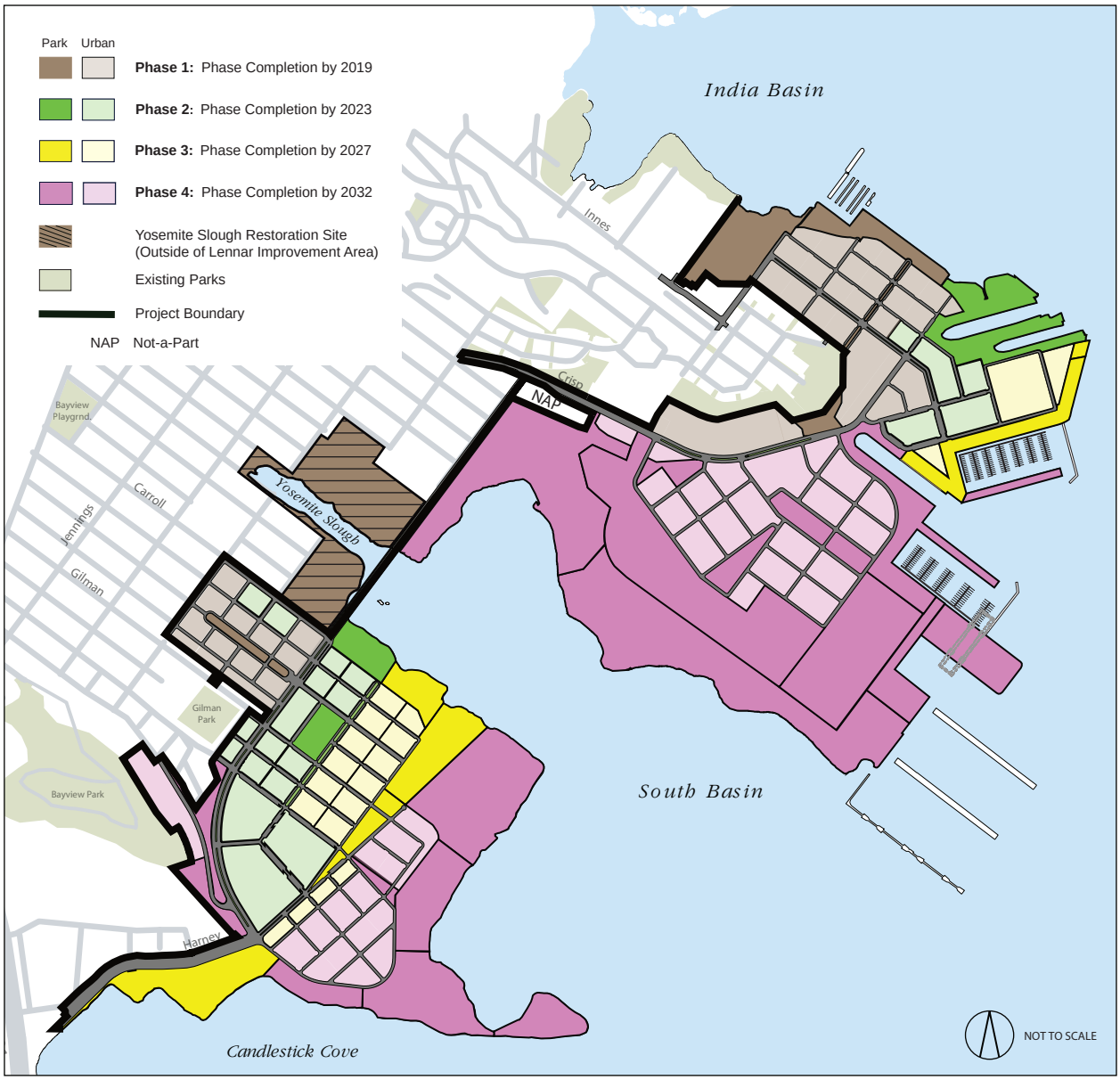
Land Use and Plans

As shown in Figure IV-1, the R&D Variant would replace the stadium proposed with the Project with an additional 2,500,000 square feet of R&D space, and a total net new gsf of 5,000,000. This would have the potential to increase land use impacts at the site as removal of the stadium from the land use program could conflict with existing applicable land use plans.

Division of an Established Community

The Project site generally includes underutilized and vacant parcels with limited access to the Bay shoreline and CPSRA. Connectivity between the Bayview Hunters Point neighborhood, Candlestick Point and HPS Phase II is limited. Large parking lots and vacant parcels at Candlestick Point separate the Bayview Hunters Point neighborhood from the Bay shoreline, and primary access roads do not include pedestrian, transit or bicycle features. Access to HPS Phase II is restricted to certain areas (those areas used for artist studios), and the area remains isolated from surrounding neighborhoods. The R&D Variant would maintain residential communities at Alice Griffith public housing and at Jamestown Avenue, similar to the Project.

- The R&D Variant (Variant 1) proposes infill development, centered on nodes of commercial and retail activity at Candlestick Point and HPS Phase II with no physical divisions. Residential and non-residential infill around these nodes of activity would provide a more continuous land use pattern and street grid, provide new services and community amenities in the Bayview Hunters Point neighborhood, allow better access to parks and recreational facilities (which would be improved under the R&D Variant [Variant 1]), and remove existing barriers to circulation and access. There are five blocks with privately owned parcels



SOURCE: Lennar Urban, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-4

R&D VARIANT (VARIANT 1)
BUILDING AND PARK CONSTRUCTION SCHEDULE

on Candlestick Point that the Applicant seeks to acquire for the development, including one on Jamestown Avenue in the Jamestown District (currently vacant) and four contiguous blocks in the Candlestick Point North District (currently vacant or developed with an RV park). If the private parcels are not acquired by the Applicant, they would be permitted under the BVHP Redevelopment Plan and the Planning Code to develop via an Owner Participation Agreement (OPA) in a manner that is consistent with the BVHP Redevelopment Plan or would be allowed to operate as an existing non-conforming use. For those parcels that are currently developed, or for any of the parcels if they develop via an OPA, that development would be included in the overall total development that would occur on the Project site. The total amount of development under this variant would not change; that is, the Applicant's development on the remaining portion of the site plus any development under separate OPAs as envisioned under the R&D Variant (Variant 1) would result in the same overall development level as proposed by the Applicant. The R&D Variant (Variant 1) would not divide an established community; therefore, no impact would occur, similar to the Project.

Consistency with Plans and Policies

Applicable plans that direct or regulate development on the Project site include the San Francisco General Plan, Candlestick Point State Recreation Area General Plan, San Francisco Bay Plan, San Francisco Bay Trail Plan, Bay Area Seaport Plan, Bayview Hunters Point Area Plan, Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, and San Francisco Planning Code. San Francisco's Sustainability Plan also applies to the Project. While the R&D Variant is generally consistent with goals and objectives of most plans, the R&D Variant would be inconsistent with land use designations that reflect former economic realities or former plans for the site. These inconsistencies would require amendments to the relevant plans, but do not reflect any impacts to the environment that the plans and policies seek to avoid. As described in connection with the Bay Plan and Seaport Plan, the designation of industrial uses along the waterfront is not a policy adopted to protect the environment, and the R&D Variant's proposals for this land represent an environmental improvement. Inconsistencies regarding the development pattern at HPS and the uses on Candlestick Point simply reflect the shifting locations of proposed uses within the site. As the primary change in land use compared to the Project would be no-stadium use, the R&D Variant's proposed changes in the arrangement of land uses would not implicate any environmental protection objectives of the current land use designations in the redevelopment plans and other applicable land use plans; thus, the inconsistencies do not give rise to a significant impact on the environment, similar to the Project.

Change to the Land Use Character

The R&D Variant would alter the land use character at the Project site with new development of residential uses, double the amount of R&D uses contemplated under the Project, regional and neighborhood retail uses, an arena, and public open space. The R&D Variant would extend the existing street grid and block pattern into HPS Phase II. The open space network would connect to the shoreline to the north and south.

This development would be considered to improve the existing land use conditions, and would not have an adverse effect on land use character of the Project site itself.

The R&D Variant would result in a substantially different built environment compared to the existing character of the site and vicinity. With the transition in scale and uses, the extension of the existing street

grid, and with the connectivity of new open space with existing shoreline open space, the R&D Variant would be compatible with surrounding land uses. In addition, the scale of development on the stadium site would be shorter with lower height limits than the 156-foot tall stadium building. The R&D Variant would not result in a substantial adverse change in the existing land use character at the Project site or vicinity. The impact would be less than significant, similar to the Project.

Population, Housing, and Employment

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. This would have the potential to increase employment opportunities at the site over levels anticipated with the Project, as discussed below (Table IV-6 [R&D Variant Employment by Land Use]). However, the permanent residential population would not change.

Direct Impacts

With the R&D Variant (Variant 1), construction is scheduled for completion beginning in the Year 2011, extending through the Year 2031, a period of approximately 20 years. This is similar to the construction schedule proposed at HPS Phase II; therefore, the number of construction personnel required at any given time at HPS Phase II would be similar to the total projected to be required for the Project. Construction employment opportunities are temporary in nature and would not result in a substantial increase in the number of employees in the area. Therefore, the R&D Variant would result in a less-than-significant impact to population during construction.

Direct population growth with the R&D Variant would include residents and employees who would occupy new homes. With the R&D Variant, the football stadium proposed with the Project would be replaced with 2,500,000 square feet of additional R&D space. There would be no change to the number of proposed housing units; therefore, compared to the Project, the permanent resident population with the R&D Variant would be the same as with the Project. The R&D Variant would generate additional jobs compared to the Project. As discussed in Section III.C (Population, Housing, and Employment), the stadium is anticipated to generate approximately 359 jobs for 12 football games and 20 other events at the stadium. The R&D Variant would generate an additional approximately 6,250 jobs at HPS Phase II, which would result in a net increase of approximately 5,905 jobs over the Project. This net increase with the Variant would represent approximately 0.8 percent of the 748,100 jobs anticipated citywide in 2030; the total number of jobs with the R&D Variant would be about 2.2 percent of the total number of jobs citywide in 2030.

Although the R&D Variant would result in an increase in employment at the HPS Phase II site, growth in this area has long been the subject of many planning activities. The R&D Variant would provide all on-site infrastructure for connections to City mains, and would include on-site treatment of stormwater runoff. Therefore, the R&D development would not encourage growth where appropriate infrastructure would not be available.

Table IV-6 R&D Variant Employment by Land Use

Land Use	*Employment Factor*[a]	*Development Program, Candlestick Point*[b]	*Employment, Candlestick Point (jobs)*	*Development Program, HPS Phase II*[b]	*Employment, HPS Phase II (jobs)*	*Total Employment (jobs)*
Residential	25 units/job	7,850 units	314	2,650 units	106	420
Regional Retail	350 gsf/job	635,000 gsf	1,814	0 gsf	—	1,814
Neighborhood Retail	270 gsf/job	125,000 gsf	463	125,000 gsf	463	926
Office	276 gsf/job	150,000 gsf	543	0 gsf	—	543
Research and Development	400 gsf/job	0 gsf	—	5,000,000 gsf	12,500	12,500
Hotel	700 gsf/job	150,000 gsf	214	0 gsf	—	214
Arena/Performance Venue	300 jobs/event[c]	150 events/year[c]	87	0 events	—	87
Public Parking	270 spaces/job[e]	3,706[e]	14	8,706 [e]	32	46
Parks and Open Space	0.26 jobs/acre[f]	104.8[g]	27	222.2[g]	58	85
Total			***3,476***		***13,159***	***16,635***
Project Total						***10,730***

SOURCES: Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project*, 2009.

a. Employment factors are from City and County of San Francisco, *Transportation Impact Analysis Guidelines*, October 2002.

b. Based on buildout floor areas provided in Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV3 for HPS Phase II.

c. Lennar Urban, LLC estimates that there would be approximately 150 events at the arena annually and that employees would work 4-hour shifts.

d. Employment factors for public parking facilities provided by Economic and Planning Systems, Inc., 2009.

e. Parking based on Table IV-3 of this EIR, Chapter II. Includes Commercial (structured) and General and Commercial (on street). Commercial and on-street parking at HPS Phase II would be increased compared to the Project to provide parking for the additional R&D space.

f. Employment factors for parks and open space provided by Economic and Planning Systems, Inc., 2009.

g. Open space acreages based on Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV-4 for HPS Phase II.

Employment growth at HPS Phase II would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. The R&D Variant would not alter the number of housing units proposed with the Project. Based on the total employment available with the R&D Variant (16,635 jobs), total housing demand would be approximately 12,807 units.[1196] Total demand for housing with the R&D Variant would represent 6.0 percent of the total Bay Area housing need of 214,500 units (based on the Regional Housing Needs Assessment (RHNA) targets; refer to Section III.C.3 [Regulatory Framework]) projected by ABAG through 2014.[1197] Based on the total employment available with the R&D Variant (16,635 jobs), total housing demand would be approximately 12,807 units. However, as discussed in Section III.C, approximately 55 percent of the workers would seek housing in the City, consistent with existing commuting patterns.[1198] As such, approximately 7,044 dwelling units would be required with the R&D Variant to meet the demand by anticipated employees. As discussed above, the R&D Variant would provide approximately 10,500 dwelling units. This would exceed the approximately 7,044 dwelling unit demand anticipated with the R&D Variant. Therefore, the population increase associated with employment with the R&D Variant could be entirely accommodated. However, it is likely that some employees with the R&D Variant would elect to live elsewhere in the City or within surrounding Bay Area communities. Based on existing commuting patterns, the R&D Variant would generate a demand for about 5,763 units in surrounding Bay Area communities. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

It is not anticipated that the increase in employment with the R&D Variant would create a substantial demand for housing in the immediate neighborhood, in San Francisco, or in the region in excess of the housing provided as part of the R&D Variant or housing otherwise available in the Bay Area. Necessary improvements to infrastructure, public services, and housing associated with direct population growth proposed as part of the R&D Variant has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant, similar to the Project.

Indirect Impacts

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be potential for development with the R&D Variant to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the R&D Variant site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

[1196] Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.

[1197] The RHNP is updated every five years and does not extend through 2030.

[1198] This assumption provides a conservative estimate of the housing demand that the Project would generate in other Bay Area communities, such as nearby cities in San Mateo County. Information pertaining to commuting trends was derived from US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006.

Infrastructure and services would be expanded to serve both the Candlestick Point and HPS Phase II sites, without significant excess capacity that might encourage additional local growth beyond that already anticipated with Proposition G and with the redevelopment plans. Development with the R&D Variant would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant, similar to the Project.

The potential for impacts due to housing displacement would be substantially similar to the Project. No housing or residents would be displaced. There would be no impact, the same as under the Project. The R&D Variant would not increase residential units proposed with the Project.

■ Transportation and Circulation

The R&D Variant (Variant 1) would increase the total amount of development compared to the Project with an increase in R&D space at HPS Phase II of 2,500,000 gsf; there would be no 69,000-seat football stadium. Therefore, the R&D Variant would not have game day or other stadium event transportation impacts associated with the Project. The R&D Variant (Variant 1) would have the same roadway, transit, bikeway, and Bay Trail improvements proposed with the Project, including the Yosemite Slough bridge. However, the bridge would be narrower than the bridge with the Project, with a 39-foot-wide right-of-way to accommodate two 11-foot-wide BRT lanes, a sidewalk, and a Class I bicycle path. At HPS Phase II, this variant would have additional roadways to serve the R&D uses at HPS South and commercial parking would be increased to serve the additional R&D space, compared to the Project.

The R&D Variant would include a Transportation System Management plan and would develop and implement a Transportation Demand Management plan, as with the Project.

The Transportation Study analyzed the R&D Variant and conclusions from the Transportation Study are presented below.

Construction Impacts

Construction activities associated with the R&D Variant would be similar to the Project. Depending on the phasing of the additional development, the R&D Variant may result in fewer construction traffic impacts between future years 2012 and 2017 when the new stadium would be constructed, and somewhat greater impacts in the years the additional R&D space would be constructed. Implementation of a Construction Traffic Management Program (the same as described for the Project) would help minimize the R&D Variant's contribution to cumulative construction-related traffic impacts. However, since some disruption and increased delays could still occur even with implementation of traffic control plans, it is possible that significant construction-related traffic impacts on local and regional roadways could still occur. Localized construction-related traffic impacts would therefore remain significant and unavoidable.

Trip Generation

The R&D Variant would have 236,291 total daily person trips and would generate 16,253 weekday AM trips, 22,586 weekday PM trips, and 19,719 Sunday PM trips. The total trips would be greater than the Project trips.

Intersection Conditions

- With the R&D Variant (Variant 1), 44 of the 60 study intersections would operate at LOS E or LOS F conditions during the weekday AM or PM, or Sunday PM peak hours. Development associated with the R&D Variant (Variant 1) would result in significant unavoidable impacts at 31 intersections, six more than for the Project. The R&D Variant would have similar project and cumulative effects at most study intersections as would occur with the Project. Section III.D, discusses traffic effects those intersections, and the feasibility of mitigation measures. As noted in Impact TR-3, Impact TR-4, Impact TR-5, Impact TR-6, and Impact TR-8, Project intersection impacts, including cumulative impacts, would remain significant and unavoidable. Those conclusions would apply as well to the R&D Variant. At six locations, the R&D Variant (Variant 1) would have significant project-level or cumulative effects on intersection conditions that would not occur with the Project. As discussed below, at four of the six intersections, the R&D Variant (Variant 1) impacts would be significant and unavoidable, and at two of the six intersections (Crisp/Palou and Innes/Earl), the impacts would be less than significant with mitigation.

  The intersection of Crisp/Palou is currently un-signalized, but would be signalized with implementation of the R&D Variant (and the Project). With the R&D Variant, the intersection of Crisp/Palou would worsen in the AM and PM peak hours from LOS E with 2030 No Project conditions to LOS F with the R&D Variant.

  Striping the southbound approach to provide a dedicated left-turn lane and a shared through/right-turn lane, and prohibiting on-street parking on Griffith Street between Palou Avenue and Oakdale Avenue would result in an LOS D at the intersection. Implementation of this improvement would be the responsibility of SFMTA and DPW, the Project Applicant shall contribute its fair-share toward construction of this mitigation measure. Prior to payment of the contribution, the City shall create a mechanism to determine and receive fair share contributions from the Project Applicant. The SFMTA and DPW shall design and implement the measure as necessary.

  With implementation of this measure, the Crisp/Palou intersection would operate at acceptable LOS D or better in the AM and PM peak hours, and therefore R&D Variant and cumulative impacts at this intersection would be less than significant.

  The intersection of Ingalls/Carroll is un-signalized, but would be signalized with implementation of the R&D Variant. The intersection of Ingalls/Carroll would worsen in the PM peak hour from LOS C under year 2030 No Project conditions to LOS E with the R&D Variant. The degradation in level of service at this intersection would primarily be due to heavy increases in traffic on Ingalls Street, particularly in the southbound direction in the PM peak hour. Ingalls Street would serve as the most direct auto traffic route for traffic from the Hunters Point Shipyard site destined for Candlestick Point and US-101. Therefore, it would experience substantial traffic increases as part of the R&D Variant.

  To accommodate additional right-of-way needed for additional lanes on southbound Ingalls, Ingalls Street would need to be widened to the east and west. This would require prohibition of on-street parking, which the industrial businesses on this section of Ingalls Street use for loading and unloading, or would require substantial narrowing of the sidewalks. Narrowing of sidewalks would create longer pedestrian crossing distances, and would require more pedestrian crossing time as part of a signal phasing plan. Because widening Ingalls Street would worsen pedestrian conditions, this mitigation was considered infeasible. Alternatively, a

mitigation measure that reduced travel demand on Ingalls Street by providing an alternate route, such as the Yosemite Slough bridge, would improve operations at this intersection. The proposed new bridge across Yosemite Slough would accommodate four lanes of traffic on game days only plus two transit-only lanes, open at all times, under the Project scenario. However, allowing traffic on the Yosemite Slough bridge at all times would have potential secondary impacts to Yosemite Slough associated with noise, air quality, and visual impacts, and would be inconsistent with the overall character of the Yosemite Slough restoration. Therefore, opening the Yosemite Slough bridge to regular traffic was not considered further.

Since widening Ingalls Street and providing an alternate traffic route via the Yosemite Slough bridge would not be feasible, R&D Variant-related and cumulative impacts at this intersection would be significant and unavoidable.

At the signalized intersection of Bayshore/Oakdale, the intersection operating conditions would worsen in the PM peak hour from LOS C under 2030 No Project conditions to LOS E with the R&D Variant. The degradation in level of service would primarily be due to forecasted substantial traffic volume increases on Bayshore Boulevard. Mitigation for this impact would involve increasing capacity on Bayshore Boulevard. There is inadequate right-of-way to provide additional lanes on Bayshore Boulevard without widening the roadway. Roadway widening would require major right-of-way acquisition along the entire Bayshore Boulevard corridor, at substantial cost and displacement of existing homes and businesses. R&D Variant and cumulative impacts at this intersection would be significant and unavoidable.

At the un-signalized intersection of Innes/Earl, operating conditions would worsen in the PM peak hour from LOS C under 2030 No Project conditions to LOS E with the R&D Variant, and traffic signal warrants would be met. The intersection is proposed as a side street STOP sign controlled intersection, with movements along Innes Avenue uncontrolled and movements on southbound Earl Street controlled by a STOP sign. The degradation in level of service would be primarily due to large increases in traffic along Innes Avenue. The high traffic volumes on Innes Avenue would cause additional delay for traffic attempting to exit Earl Street, which is assumed to provide a single lane to accommodate both southbound right-turns and southbound left-turns onto Innes. The R&D Variant would result in higher volumes of traffic along Innes Avenue than the Project, therefore creating higher delays for southbound traffic on Earl Street.

Installing a traffic signal at the intersection of Innes/Earl would improve intersection operations to LOS D or better conditions. This intersection would be close to meeting peak-hour traffic signal warrants with build-out of the R&D Variant. The Project Applicant, in collaboration with the City, shall monitor traffic volumes as the Project builds out to determine whether the intersection volumes would actually warrant a traffic signal. Based on the monitoring, if the City determines a traffic signal is warranted, the Project Applicant shall be required to install a traffic signal as part of later development phases.

Implementation of this improvement would be the responsibility of SFMTA, and should be implemented when traffic conditions worsen to unacceptable levels. Since this mitigation has also been identified as needed for 2030 No Project conditions, the Project Applicant shall contribute its fair-share toward construction of this mitigation measure. Prior to payment of the contribution, the City shall create a mechanism to determine and receive fair share contributions from the Project Applicant. The SFMTA and DPW shall design and implement the measure as necessary.

With implementation of the signalization, R&D Variant and cumulative impacts at the Innes/Earl intersection would be less than significant.

With the R&D Variant, the Evans/Jennings intersection would be signalized and restriped to accommodate the future travel patterns, and the intersection would operate at LOS E in the AM peak hour, and the R&D Variant would contribute considerably to the poor operating conditions. Additional capacity would be required in the eastbound and southbound directions to accommodate the additional vehicles generated by the R&D Variant. Additional lanes would require substantial right-of-way acquisition to the north or south of Evans Avenue, and on Jennings Street. Right-of-way acquisition is not considered feasible, and therefore, R&D Variant-related and cumulative impacts at Evans/Jennings would be significant and unavoidable.

Traffic spillover effects with the R&D Variant would be significant and unavoidable, as with the Project.

- At the signalized intersection of Cesar Chavez/Evans, the R&D Variant (Variant 1) would contribute significantly to cumulative impacts identified for the 2030 No Project conditions. The Transportation Study (Appendix D) explains in the 2030 No Project analysis, that the Hunters Point Shipyard Redevelopment Plan FEIR identified a mitigation measure at this intersection that involved a reconfiguration of the northbound approach of Evans Avenue to Cesar Chavez Street to provide exclusive northbound left and right turn lanes, and changing the signal timing plan to include the exclusive left turn and right turn movements. The measure identified that the northeast corner curb return would require structural modifications to the existing viaduct. DPW, as part of the BTI Project analysis, determined that widening of the existing structure supporting the intersection of Evans Avenue and Cesar Chavez Street is not feasible. The R&D Variant (Variant 1) and cumulative impacts at this intersection would be significant and unavoidable.

Freeway Conditions

The R&D Variant effects on freeway mainline sections would be similar to the Project, although the magnitude of impacts may be greater with the R&D Variant due to increased traffic generation compared to the Project. The R&D Variant would cause the mainline section of US-101 northbound from Sierra Point to Alana/Harney/Geneva to deteriorate from LOS E to LOS F in the AM peak hour. This would be an additional significant impact associated with the R&D Variant. However, no feasible mitigation measures have been identified for the freeway segments expected to experience significant impacts with 2030 No Project conditions or with the Project. Therefore, the R&D Variant-related and cumulative effects freeway operating conditions on this segment would be considered significant and unavoidable.

The R&D Variant effects on freeway ramp junctions would be similar to the Project, although the magnitude of impacts may be greater with the R&D Variant due to increased traffic generation compared to the Project. As described for Project impacts, no feasible mitigation measures have been identified for future freeway ramp junction conditions. Therefore, the R&D Variant contribution to freeway ramp operating conditions would be considered significant and unavoidable.

The R&D Variant ramp queuing effects would be similar to Project effects. The R&D Variant would result in significant impacts with respect to ramp queuing at the same off-ramp locations as the Project, with one exception. With the R&D Variant, the US-101 northbound off-ramp to Harney Way would not be likely

to experience queues extending back to the mainline in the PM peak hour. However, the R&D Variant's contribution to other impacts associated with queuing would be the same as the Project. As described for Project impacts, no feasible mitigation measures have been identified for the freeway off-ramps expected to experience significant impacts. Therefore, the R&D Variant's contribution to freeway segments operating at LOS E or LOS F conditions would be considered significant and unavoidable.

Transit Impacts

The R&D Variant, as with the Project, would include extended and new transit services; transit trips with the R&D Variant would be accommodated within the capacity of these services. The R&D Variant, as with the Project, would have a less than significant impact with mitigation on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with the R&D Variant would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. Project mitigation measures MM TR-21 to MM TR-30 would also apply to the R&D Variant, but as concluded in Section III.D, the feasibility or implementation of the measures is uncertain, and the transit delay effects would remain significant and unavoidable.

The R&D Variant would require additional vehicles on the same routes as the Project. During the PM peak hour, the R&D Variant would require additional vehicles on the same routes as the Project; the R&D Variant would require additional vehicles on the 48-Quintara. Impacts associated with the R&D Variant would be more extensive than those for the Project, and would be significant and unavoidable.

Bicycle Impacts

The R&D Variant bicycle trips would be accommodated within the proposed street and network, and impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The R&D Variant would be accommodated within the proposed sidewalk and pedestrian network, and impacts on pedestrian circulation would be less than significant.

Parking Impacts

The R&D Variant would result in a demand for about 25,165 spaces, compared with a maximum permitted supply of about 19,874 spaces; therefore, the maximum off-street parking supply would be about 5,290 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. Due to parking supply constraints and accessibility to transit, future R&D Variant parking demand may be somewhat lower than estimated, and therefore the parking space shortfall would also be less than the number of spaces that would be required in order to accommodate all the vehicles anticipated if the proposed parking supply was unconstrained. Since the parking supply would be constrained, the actual parking demand would be expected to be less. As discussed in Section III.D, peak parking demand would not represent do not occur simultaneously; public parking facilities, such as the one proposed in Candlestick Point, and on-street parking spaces can usually be shared efficiently among many destinations; and the R&D Variant would include a Travel Demand Management program that includes a number of parking strategies to make auto use and ownership less attractive, as well as strategies to encourage alternative modes.

As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and R&D Variants impacts on parking would be less than significant.

The R&D Variant would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

- ***Arena Impacts***

The R&D Variant (Variant 1) would have the same arena-related transportation effects as with the Project, that is, significant and unavoidable impacts on traffic and transit operations, except the impact to transit operations would be caused by traffic congestion (as for the Project) and by possibly added transit demand. Since the amount of background transit demand under the R&D Variant (Variant 1) would be higher than the Project, it is possible that the added transit demand associated with a sold-out arena event would create demand for transit service greater than the capacity of the transit supply to the arena. This possible effect would be reduced by having SFMTA increase the frequency on regularly scheduled Muni routes (primarily the CPX-Candlestick Express) serving the arena area prior to large events at the arena. Additional shuttle service provided by the arena operator to key regional transit destinations, such as BART, Caltrain, and the T-Third light rail route would also reduce this possible effect, but as for the Project, even with this mitigation and the mitigation identified for the Project to address impacts on transit operations, MM TR-23.1 (Maintain proposed headways for the 29 Sunset), the impact on transit operations would, like the Project, remain significant and unavoidable. Likewise, impacts on traffic, as for the Project, would be reduced but not avoided with implementation of mitigation measure MM TR-41 (Transportation Management Plan for the arena).

Aesthetics

As shown in Figure IV-1, the R&D Variant would replace the 49ers stadium proposed with the Project with an additional 2,500,000 gsf of R&D space. Construction impacts would be substantially similar to the Project. Operational impacts would be similar but less than those identified with the Project, as the proposed R&D buildings would be lower in height than the stadium. All other urban design and building forms with the R&D Variant, and resulting effects, would be similar to conditions with the Project.

Construction

- As noted above, construction impacts of the R&D Variant (Variant 1) on the visual character of the area would be similar to the Project, except that the R&D uses would be constructed by 2031, later than the

2017 construction of the Project stadium. This would not change the significance of impacts. Construction activities would occur throughout the 702-acre R&D Variant (Variant 1) site over the approximately 20-year build-out period, ending in 2031. Visual impacts associated with construction activities would include exposed pads and staging areas for grading, excavation, and construction equipment. In addition, temporary structures could be located on the site during various stages of demolition or construction, within materials storage areas, or associated with construction debris piles on and off site. Exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible for the proposed utilities and infrastructure improvements, as well as for roadway improvements. Although these activities would take place primarily within the R&D Variant site, they would be visible to surrounding land uses. However, these visual conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Further, temporary conditions (e.g., bulldozers, trenching equipment, generators, trucks, etc.) associated with construction would not result in obstruction of a scenic vista, as construction equipment is not tall enough to interfere with views of the Bay, the East Bay hills, or the San Francisco downtown skyline. The R&D Variant site is not located within a state scenic highway. The only scenic resources on or near the site are the CPSRA, the Re-gunning crane, Yosemite Slough, the shoreline, the Bay, San Bruno Mountain, and Bayview Hill. There are no rock outcroppings or major areas of landscaping on the site, although some ruderal vegetation would be removed. Construction of the R&D Variant would not affect the Re-gunning crane, which would remain intact after implementation of the R&D Variant. Therefore, construction activities would have a less-than-significant impact on scenic vistas and scenic resources, similar to the Project. Mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts during Construction) would further reduce potential impacts to the visual character of the area.

Construction impacts of the R&D Variant to light and glare would be similar to the Project. Construction would occur during daylight hours, generally between 7:00 A.M. and 8:00 P.M. or as otherwise allowed by the City. A minimal amount of glare could result from reflection of sunlight off windows of trucks, but this would be negligible and would not affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the R&D Variant site, and would not exceed the level of existing night lighting levels in urban areas. In addition, construction lighting would comply with any City of San Francisco lighting requirements. Therefore, construction activities would have a less-than-significant impact due to light and glare.

Operation

Operational impacts to views would be substantially similar to the impacts of the Project. Development at Candlestick Point would remain the same as with the Project and impacts would be the same as identified with the Project. With the R&D Variant, the football stadium proposed with the Project would be replaced with 2,500,000 square feet of additional R&D space at the HPS Phase II site (Figure IV-5 [R&D Variant Northeast from CPSRA]). The proposed 69,000-seat 49ers football stadium would be approximately 156 feet tall (about 15 stories) above the adjacent playing field. In contrast, buildings constructed as part of the R&D development would range in height from 40 feet to 65 feet, a minimum of approximately 90 feet below the heights proposed with the Project. The area surrounding the additional R&D space would be developed with new open space to the west, south, and east, and by new R&D uses to the north. With respect to adjacent neighborhoods, the HPS Phase II North district would be south of the India

Basin neighborhood (Figure IV-6 [R&D Variant South from Hilltop Open Space]). Therefore, development with the R&D Variant would result in a less-than-significant impact due to obstruction of a view or scenic vista, similar to the Project.

Development of the R&D Variant would have substantially similar impacts to the Project regarding the potential for damaging scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting because design of the proposed R&D buildings would be of appropriate height, massing, and architectural treatment. The R&D Variant would replace the development program of the football stadium proposed with the Project with 2,500,000 square feet of additional R&D space. Development at Candlestick Point would remain the same as with the Project and impacts would be the same as identified with the Project. At the HPS Phase II site, the R&D Variant would continue to remove old, deteriorating structures associated with ship repair, piers, dry-docks, storage, and administrative uses and replace these structures with new development. Currently, HPS Phase II contains limited landscaping and is primarily a degraded industrial setting. Bayview Hill is a prominent scenic resource on the site and would remain intact with the R&D Variant development with the exception of close-in vantage points, which may be altered. The R&D Variant site is not located within a state scenic highway. The R&D Variant would retain structures at the potential HPS Drydock Historic District, as well as the Re-gunning crane, a highly visible visual reference point. Development of the HPS Phase II site with the R&D Variant would also include about 327 acres of new and renovated parkland, open space, and sports fields, with improved public access, thereby improving the scenic quality of the area (this is 9.4 fewer acres than the Project would provide). Therefore, development at the HPS Phase II site would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting, and the impact would be less than significant. Additionally, the R&D Variant development would not substantially degrade the visual quality or character of the R&D Variant site or its surroundings and the impact would be less than significant.

The R&D Variant would not include the field lighting and other nighttime lighting associated with the 49ers stadium. The Variant would have way-finding, security, and street lighting associated with R&D uses and other development at HPS Phase II. The R&D Variant would not interfere with any existing views of the night sky from across the Bay, nor would glare affect these views, similar to the Project. New sources of light associated with neighborhood retail use during the evening and residential uses at night could result from the R&D Variant, similar to the Project. Impacts of the R&D Variant would be slightly less than the Project due to the elimination of the stadium, and would result in a less-than-significant impact with incorporation of mitigation measures MM AE-7a.1 (parking lot lighting), MM AE-7a.2 (landscape and sign illumination), MM AE-7a.3 (lighting plan), and MM AE-7a.4 (nonreflective materials).

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-5

Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT NORTHEAST FROM CPSRA

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-6

Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT SOUTH FROM HILLTOP OPEN SPACE

Shadows

As shown in Figure IV-1 (R&D Variant Land Use Plan), the R&D Variant would replace the football stadium proposed under the Project with an additional 2,500,000 square feet of R&D space. Operational impacts would be similar to those identified under the Project, although shade impacts would be slightly less, as the proposed R&D buildings would be lower in height than the stadium.

Construction

As with the Project, construction activities of the R&D Variant would not result in shadow effects on open space.

Operation

For the R&D Variant, development at Candlestick Point would be the same as the Project. Thus although development at Candlestick Point would result in new structures with the potential to cast shadows on existing or proposed parks and open space, shadows would not substantially affect outdoor recreation facilities or other public areas and impacts would be less than significant, same as the Project.

As shown in Figure IV-2, the R&D Variant would develop buildings up to 65 feet high in the Hunters Point Shipyard South district, compared to the 49ers stadium up to 156 feet high with the Project. All other land use and building heights in the Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same as with the Project. Overall, shadow effects of the R&D Variant at HPS Phase II would be similar to effects with the Project.

HPS Phase II would include new open space at Grasslands Ecology Park, Sports Fields, and Multi-Use Lawn at Hunters Point Shipyard South, the Waterfront Recreation Pier, the Waterfront Promenade, Heritage Park, and Northside Park. The R&D Variant would have a different configuration of open space at Hunters Point Shipyard South than the Project. Refer to Figure IV-1.

As the building heights and land uses at Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same for the R&D Variant as the Project, development at those locations would not add shade year round to existing public open space, including India Basin Shoreline Park and India Basin Open Space.

During morning and mid-day periods from September through March, the R&D Variant would have similar shading effects as the Project, on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Parks and Open Space. In mid-afternoon, the Variant would shade the Waterfront Promenade. During summer months, the R&D Variant Shade effects would be similar to the Project, with shade on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Open Space. Although the R&D Variant would cast shadows on recreational and open space, it would not substantially affect outdoor recreation facilities or other public areas or have an adverse effect on the use of the open space and impacts would be less than significant, similar to the Project.

Wind

As shown in Figure IV-2, the R&D Variant would replace the 156-foot tall football stadium with 40- and 65-foot-tall R&D buildings, substantially less than the 100-foot height threshold at which wind impacts are anticipated.

Construction

Construction activities of the R&D Variant would not result in additional wind impacts, similar to the Project. Impacts such as fugitive dust emissions and erosion from wind are addressed in Section III.H (Air Quality) and Section III.M (Hydrology and Water Quality).

Operation

Building structures near or greater than 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 mph equivalent wind speed for a single hour of the year would be exceeded. There is no threshold height that triggers the need for wind tunnel testing to determine whether the building design would result in street-level winds that exceed the standard. It is generally understood, however, from wind tunnel testing on a variety of projects in San Francisco, that most, if not all, buildings under 100 feet do not result in adverse wind effects at street level barring unusual circumstances.

For the R&D Variant, development at Candlestick Point would be the same as the Project. Thus development at Candlestick Point would result in new structures with the potential generate winds that could affect ground-level pedestrian spaces. Implementation of mitigation measure MM W-1a (Building Design Wind Analysis), which would require a design review process for buildings greater than 100 feet in height, and if determined to be necessary, inclusion of a design criteria to reduce pedestrian-level impacts, would reduce impacts to a less than significant level, similar to the project.

Development at HPS Phase II would replace the 156 high football stadium with R&D buildings with heights of 65 and 40 feet, which is less than the 100-foot height threshold at which buildings could generate winds that could affect ground-level pedestrian spaces. Thus, with the reduction in building heights, impacts at HPS Phase II would be less than significant. As the additional R&D uses would not exceed 100 feet in height and would not result in adverse wind effects, impacts would be less than the Project.

Air Quality

As shown in Table IV-1, the R&D Variant would replace the 49ers stadium proposed with the Project with an additional 2,500,000 gsf of R&D space (total R&D uses would equal 5,000,000 gsf). Construction impacts would be substantially similar to the Project. Operational impacts would be similar but greater than those identified under the Project as the proposed additional R&D development would result in greater daily criteria pollutant emissions than the stadium.

Construction

As stated above, overall construction impacts of the R&D Variant (Variant 1) with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre R&D Variant (Variant 1) site over the approximately 20-year build-out period ending in 2031, with the construction of

the additional R&D facilities occurring between 2018 and 2031. Similar to the Project, construction activities under the R&D Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

With respect to construction emissions, construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[1199] Any project within the City of San Francisco, including the R&D Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, impacts would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the R&D Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1200] that evaluated potential human health risks associated with construction and operation of the Project quantitatively and the proposed variants qualitatively, including the R&D Variant. As construction emissions associated with the R&D Variant are expected to be lower than those associated with construction of a stadium in the same location (e.g., Project), the R&D Variant would have lower impacts than the Project.

The HRA evaluated potential impacts to numerous receptors (off-site residents, off-site workers, off-site students, and on-site residents) in and around the Project. BAAQMD CEQA Guidelines have an

[1199] BAAQMD. 1999. *BAAQMD CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*. December.
[1200] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II of the report.

established threshold of 10 in one million for carcinogenic health risks; the HRA concluded that the inhalation cancer risk at the MEI would be 4.5 in one million. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the threshold. The R&D Variant is not anticipated to exceed Project impacts and therefore would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.01, which is below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the R&D Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the R&D Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the R&D Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

Operational impacts to regional and local air quality would be substantially similar to the Project. Development at Candlestick Point would remain the same as under the Project and impacts would be the same as identified under the Project. Under the R&D Variant, the football stadium proposed under the Project would be replaced with 2,500,000 square feet of additional R&D space at the HPS Phase II site. Due to the additional vehicular trips associated with the increased amount of R&D uses under this variant, the level of emissions anticipated under the R&D Variant would be greater than the Project, as shown in

- Table IV-7 (R&D Variant [Variant 1] Operational Criteria Pollutant Emissions [Year 2032]). The difference in daily criteria pollutants would increase under the R&D Variant compared to the Project by 6 to 12 percent.

However, both the R&D Variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The R&D Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. The R&D Variant's transportation analysis estimates that a similar R&D development that did not include the trip reduction features of the R&D Variant would generate 147,682 daily external motor vehicle trips (about 71 percent more than the R&D Variant's daily external motor vehicle trips). The comparison of the R&D Variant to a similar level of development under "business as usual" conditions is also shown in Table IV-7.

Table IV-7 R&D Variant (Variant 1) Operational Criteria Pollutant Emissions (Year 2032)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Hunters Point Shipyard					
Area[a]	182	55	44	1	1
Motor Vehicles (External)	119	109	1,247	576	108
Subtotal	*302*	*164*	*1,291*	*578*	*110*
Candlestick Point					
Area[a]	449	70	53	4	4
Motor Vehicles (External)	216	195	2,221	1,025	193
Subtotal	*665*	*265*	*2,274*	*1,028*	*196*
All Development Sites					
Area[a]	631	125	97	5	5
Motor Vehicles (External)	335	304	3,468	1,601	301
Motor Vehicles (Internal)	30	13	228	45	9
All Sources (R&D Variant)	***997***	***442***	***3,793***	***1,650***	***315***
Comparison to Proposed Project	***106%***	***112%***	***111%***	***111%***	***111%***
Change from Proposed Project	*6%*	*12%*	*11%*	*11%*	*11%*
Comparison to Business as Usual	***89%***	***74%***	***70%***	***64%***	***65%***
Reduction from Business as Usual	*-11%*	*-26%*	*-30%*	*-36%*	*-35%*
All Development Sites (Business as Usual)					
Area[a]	631	125	97	5	5
Motor Vehicles	485	476	5,292	2,561	481
All Sources (Business as Usual)	***1,117***	***601***	***5,389***	***2,566***	***486***
Comparison to R&D Variant	***112%***	***136%***	***142%***	***155%***	***154%***

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_X were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ associated with land uses anticipated under the R&D Variant would exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce the R&D Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact. It should be noted that, as stated above, although the significance under this variant would be similar to the Project, criteria pollutant emissions associated with the operation of uses under the R&D Variant would be greater than the Project, as stated in Table IV-7.

With respect to airborne human health risks, emissions associated with operation activities under the R&D Variant would increase the levels of two potential human health risks: (1) toxic air contaminants (TACs)

and (2) certain vehicle emissions ($PM_{2.5}$). Under the R&D Variant, additional R&D facilities would be constructed and operated within the HPS Phase II area.

The Project would include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the East of the proposed stadium and south of the proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors.

Based on the type of uses permitted under the Project, the potential for TACs to be emitted by the Project and affect nearby receptors would likely only occur within areas designated for R&D uses, which would be restricted to HPS Phase II. Because the Project land use designations provide that a wide range of development can operate in the R&D areas within the HPS Phase II site, the exact type of stationary sources and quantity of the emissions from those sources are not known. As a result, a conservative scenario was established so that the impact of the potential aggregate emissions from all future TAC emission sources in these R&D areas could be evaluated at surrounding receptor locations. However, for the purposes of this analysis, a conservative scenario of potential TAC emissions from each potential future source of TACs was modeled to estimate the potential health impact on nearby receptor locations. It was assumed that each allowable location for TAC emissions would emit chemicals at the maximum allowable rate, when, in fact, the TAC emissions at some of these locations within the R&D area would be below the maximum rate (for example, office building emissions for TAC would be zero or close to zero).Details regarding this assessment can be found in Appendix H1 (Ambient Air Quality Human Health Risk Assessment), Attachment III.[1201]

For this prospective screening-level analysis, a series of conservative assumptions was made:

- A wide range of stationary sources could operate in the R&D area; thus, the identity and amounts of the TACs emitted from these sources cannot be determined at this time.
- In order to approximate the maximum potential number of facilities with TAC emitting sources, the area designated for proposed R&D development would be divided into one-acre plots, which is consistent with the minimum size of a parcel based on the expected land uses within the R&D parcels.
- A single R&D facility (or a stationary source such as a collection of emitting sources like boilers, emergency generators, etc) would be constructed on the one-acre plot.
- The cancer risk at the boundary of each one-acre plot was set not to exceed a designated cancer risk level or chronic noncancer HI threshold (in this case a residential cancer risk of 10 in one million and a chronic noncancer HI of 1.0, in accordance with BAAQMD thresholds of significance).
- It was conservatively assumed that all receptor locations surrounding the R&D area were residential.

Potential health impacts of this scenario were evaluated at receptor locations within approximately 500 meters (about a third of a mile) of the R&D areas. Impacts would be lower beyond this distance. In addition, the TAC analysis conservatively used a total of 5 million square feet of R&D uses, the amount proposed in this Variant. For this screening evaluation, all surrounding receptors were conservatively

[1201] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

evaluated as residential receptors (i.e., potential exposures/risks for other populations would be less, as the exposure frequency and duration would be less than a residential scenario).

Although excess lifetime cancer risk and chronic noncancer HIs were explicitly evaluated, acute risks were not evaluated, as it would be highly unlikely that all emissions sources would be operating at their maximum emission rate at the same time (e.g., for any single hour).

The HRA[1202] estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. All receptors were initially evaluated as residential receptors. The estimated excess lifetime cancer risks and HIs within areas designated for residential use were found not to exceed the BAAQMD's significance thresholds for carcinogenic and noncarcinogenic health risks.

The estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space or stadium that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 26 in one million; the noncarcinogenic health risks would have an HI of 2.6. However, as noted above, this receptor location would be in an area designated as open space or stadium use, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of mitigation measures MM AQ-6.1 and MM AQ-6.2.

In terms of human health risks associated with vehicle emissions, vehicle trips and thereby vehicle emissions along local roadways would increase with development of the R&D Variant (Variant 1), similar to the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations from traffic associated with the R&D Variant (Variant 1) were estimated at selected roadways and compared against the 0.2 $\mu g/m^3$ action level to determine the potential health risks on receptors attributed to vehicle emissions from the R&D Variant (Variant 1). Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of *San Francisco* and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

[1202] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

- With the addition of Variant-related traffic, no receptors along the streets listed above would experience an increase in $PM_{2.5}$ concentrations in excess of the 0.2 $\mu g/m^3$ action level.[1203] Concentrations would not exceed the action level, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed under the Project with an additional 2,500,000 square feet of R&D space. Other than the stadium site, land uses provided with a R&D Variant would be the same as the Project. As land uses would remain the same, the potential noise impacts would be the same as the Project with the exception that the noise impact from operation of the stadium would not occur under the R&D Variant.

Construction activities for a R&D Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the R&D Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a R&D Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a R&D Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a R&D Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with the R&D Variant are shown in Table IV-8 (R&D Variant Modeled Traffic Noise Levels along Major Project Site Access Roads). Impacts would be significant, similar to the Project. However, in addition to Carroll Avenue, Gilman Avenue, and Jamestown Avenue, which were identified as being significantly impacted by the Project, the R&D Variant would also include

[1203] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, May 4, 2010.

significant noise level increases along 3rd Street and Ingalls Street as shown in the table. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Table IV-8 R&D Variant Modeled Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*2030 With R&D Variant*	*Variant-Related Increase*	*Allowable Increase*	*Significant Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	60.9	0	2	No
3rd Street south of Carroll Avenue	Residential	**62.8**	**67.3**	**68.3**	**68.5**	**1.2**	**1**	**Yes**
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	63.6	0.1	2	No
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	62.9	1.3	2	No
Ingalls Street north of Carroll Avenue	Residential	**56.7**	**61.7**	**63.1**	**63.8**	**2.1**	**2**	**Yes**
Carroll Avenue east of 3rd Street	Residential	**52.6**	**53.8**	**58.1**	**58.1**	**4.3**	**3**	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**64.6**	**4.0**	**2**	**Yes**
Jamestown Avenue north of Harney Way	Residential	**51.4**	**55.5**	**61.2**	**61.2**	**5.7**	**5**	**Yes**
Harney Way west of Jamestown Avenue	Residential	52.6	59	59.6	59.6	0.6	3	No
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	68.7	0.2	1	No

SOURCE: PBS&J 2009
Noise model data sheets are available in Appendix I3 (Traffic Noise Model Output)

Because the R&D Variant would not include a football stadium, noise impacts identified for the Project from football games and concerts would not occur with implementation of the R&D Variant.

The R&D Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the R&D Variant does not include an aviation component. Therefore, an R&D Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. Both construction and operational impacts would be substantially similar to the Project because construction activities as well as the area and type of land disturbance would be similar. Additionally, the types of land use and associated activities are similar and were all analyzed in the initial land program.

Potential impacts to paleontological resources with the R&D Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Although no fossils have been reported at the

HPS Phase II site, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. Additionally, the presence of Bay mud under the fill around Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. However, mitigation measure MM CP-3a (paleontological resources) would reduce the effects of construction-related activities to paleontological resources to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*. Therefore, the R&D Variant would result in a less-than-significant impact to paleontological resources during construction activities, similar to the Project.

Potential impacts to archaeological resources with the R&D Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Records indicate that prehistoric archaeological sites are located within the HPS Phase II site, including CA-SFR-9, CA-SFR-11, CA-SFR-12, CA-SFR-13, and CA-SFR-14. Previous archaeological investigations have shown that prehistoric archaeological sites in the HPS Phase II site tend to be located along the original shoreline. Hunters Point had numerous maritime-related industries, including dry docks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site and construction activities may encounter previously unknown archaeological resources. Mitigation measure MM CP-2a (archaeological resources) would reduce the effects of construction-related activities to the archaeological resources in the HPS Phase II site to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. Therefore, the R&D Variant would result in a less-than-significant impact to archaeological resources during construction activities, similar to the Project.

Historical resources at HPS Phase II include the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, with buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility."[1204] Contributing resources in the Hunters Point Historic District include Drydock 2, Drydock 3, and Buildings 140, 204, 205, 207, 208, 211, 224, 231, and 253.

- As with the Project, development at HPS Phase II with the R&D Variant (Variant 1) would result in the demolition of Buildings 211, 224, 231, and 253, which have been determined eligible as contributors to the California Register of Historic Resources (CRHR)–eligible Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. While the land use changes with the R&D Variant would not affect the HPS Phase II area within that potential historic district, the implementation of the Variant as a whole would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce but not avoid the significant adverse impact. As with the Project, the impact on historical resources with the R&D Variant would remain significant and unavoidable.

[1204] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.

Operational activities anticipated with the R&D uses would not differ substantially from the Project because neither would include ground-disturbing activities that would accelerate the potential deterioration of cultural resource. No changes would be made to the land use program within Candlestick Point. These activities would not have the potential to adversely disturb paleontological, archaeological, or historical resources. Therefore, the R&D Variant would result in no impact to these resources, similar to the Project.

Hazards and Hazardous Materials

The building footprint of the R&D Variant would be somewhat greater than the Project, as more structures would be constructed. Construction activities associated with the R&D Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the R&D Variant would be slightly greater than for the Project, but, similar to the Project, and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the R&D Variant would require improvements to existing utility infrastructure and installation of new underground utilities, which could expose construction workers, the public, or the environment to hazardous materials. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The R&D Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the R&D Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety

plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2 (Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects). In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the R&D Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the R&D variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the R&D Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed, above, the R&D Variant includes a greater amount of excavation and construction than that anticipated under the Project. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the R&D Variant. Consistent with the discussion above, the R&D Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the R&D Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. Implementation of mitigation measures MM HZ-1a and MM HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all

requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II, mitigation measure MM HZ-9 requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

The R&D Variant would replace the proposed stadium at HPS Phase II with R&D uses. This could result in a greater amount of hazardous materials being used compared to a stadium use, depending on the tenants that would occupy the R&D Variant. After construction, land uses anticipated under the R&D Variant would involve the routine use, storage, transportation, and disposal of hazardous materials to a greater extent than under the Project, depending on the tenants of the R&D area. The R&D Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. Products containing hazardous materials used in additional square footage anticipated under the R&D Variant would be incrementally small, and would not substantially increase the risk from handling these materials. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The Project would comply with all applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials. Impacts would be less than significant, similar to the Project.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. The precise amount of hazardous materials that would be transported to or from the site under the R&D Variant is difficult to predict accurately at the current time due to the pending selection of tenants for the future retail-commercial stores. However, it is understood that these uses would be consistent with those uses analyzed for the Project and therefore, potential impacts would be similar under this variant to the Project's impacts.

Daily operations under the R&D Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but it would not pose a human health risk and/or result in an adverse effect on the environment. With potentially increased routine use of hazardous materials compared to existing conditions, exposure of future occupants, visitors, and employees to hazardous materials could occur by improper handling or use of hazardous materials or hazardous wastes during operation of the R&D Variant. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The R&D Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the R&D Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The R&D Variant site is also

not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site.

Similar to the Project, operation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. Both construction and operational impacts to geology and soils would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those under the Project, with the exception of the football stadium due to its removal.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with the R&D Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the R&D Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the R&D Variant would be substantially similar to those of the Project.

The potential for exposure to adverse effects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures and the Yosemite Slough bridge, as required by the SFBC. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the R&D Variant, the potential for adverse effects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the R&D Variant, 2,500,000 square feet of additional R&D space would replace the football stadium that is programmed for development with the Project. This specific area is not located adjacent to the shoreline such that the R&D Variant could result in impacts greater than those discussed with the Project. Therefore, the R&D Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse effects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse effects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level, similar to the Project.

With the R&D Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the R&D Variant.[1205] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the R&D Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The R&D Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

Construction

The footprint of development for the R&D Variant would be the same as for the Project, although the construction of additional R&D space would slightly increase the extent of excavation for the foundation of buildings. As such, impacts from construction of the R&D Variant would be similar to the Project. With additional R&D buildings replacing the stadium and associated parking lots, the total amount of development would increase, as would the extent of impervious surfaces. Thus, operational impacts to hydrology and water quality would generally be greater than the Project.

With adherence to applicable regulatory requirements, construction activities associated with a R&D Variant would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With additional excavation for building foundations, impacts would be greater than the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a Storm Water Pollution Prevention Plan—SWPPP—for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

[1205] GTC, 2005.

Construction activities associated with the R&D Variant would include excavation for building foundations and underground utilities which could require short-term and/or long-term dewatering of the affected areas. As no extensive underground space is proposed for the R&D Variant, the installation of underground building elements and utilities would not substantially alter groundwater levels, similar to the Project. As such, the R&D Variant would not substantially deplete groundwater supplies and would result in a less than significant impact, similar to the Project. As the total amount of open space under the R&D Variant would remain the same as under the Project, the amount of permeable surface would also remain the same. Therefore, the R&D Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the R&D Variant site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of the R&D Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the R&D Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on-site or off-site. Impacts would be less than significant, similar to the Project.

Construction activities associated the R&D Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of an SWPPP) impacts would be less than significant, similar to the Project.

Operation

Operation of the R&D Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, the R&D Variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas

California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the R&D Variant would be greater than the Project, impacts would be greater than the Project.

Development under the R&D Variant would also not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of the R&D Variant could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on-site or off-site similar to the project. Implementation of the R&D Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a Stormwater Drainage Master Plan (SDMP) and Stormwater Control Plan (SCP) to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of the R&D Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the R&D Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

The R&D Variant would replace the football stadium proposed under the Project with an additional 2,500,000 square feet of R&D space. Both construction and operational impacts to biological resources would be similar to the Project, as discussed below, because the type of development and associated construction activities are generally the same.

Construction

Development of the R&D Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

The R&D Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. The Sports Field Complex proposed with the R&D

Variant would be 40.7 acres, which is 19 acres less than the Sports Field Complex proposed under the Project. Approximately 9.4 acres of new parks and plaza spaces are proposed to be located adjacent to the R&D uses, which would provide additional habitat for common plant and wildlife species. Impacts to common species or habitats would be less than the Project, and remain less than significant, similar to the Project.

Development of the R&D Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur. Similar to the Project, the R&D Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the R&D Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the *Clean Water Act* (CWA) (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the R&D Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would

ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the R&D Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the R&D Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the R&D Variant would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the R&D Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

■ Public Services

Construction

Police and Fire Services

Similar to the Project, access to the R&D Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program

of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the R&D Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the R&D Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of the R&D Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Project would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the R&D Variant would be similar to construction of the Project, no impact to school or library services during construction of the Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Operational impacts to police services would be similar to the Project in as much as they would be considered less than significant. However, compared to the Project, the R&D Variant would result in a more substantial long-term daytime only population of employees as a result of the R&D uses. Therefore, impacts to police protection services could be greater than the Project, although still less than significant.

The R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. The R&D Variant would not increase the permanent resident population above that anticipated with the Project. However, as shown in Table IV-6, the R&D Variant is anticipated to generate a total of 16,635 jobs, approximately 5,905 more jobs than with the Project. As such, the resident and worker population in the area at full build-out with the R&D Variant would be 41,101.[1206] Patrolling this area and responding to calls would require at least a redeployment of police services within the Bayview District, or within a wider area given the current recommendations for redistricting. Additional police resources that would be required to patrol the football stadium on game days with the Project would not be required with the R&D Variant, thereby reducing that potential impact.

Impacts on police protection services are considered significant if an increase in population or development levels result in inadequate staffing levels (as measured by the ability of the SFPD to respond to call loads) and/or increased demand for services that would require the construction or expansion of new or altered

[1206] Calculated as the combined total of a residential population of 24,465 plus a worker population of 16,635. This is a conservative estimate since it is not likely that the entire resident population and daytime population would be on site at the same time.

facilities that might have an adverse physical effect on the environment. The demand for additional police personnel alone would not be considered a physical environmental impact under the provisions of CEQA.

To estimate personnel requirements for new projects, the SFPD considers the size of the incoming residential population and the expected or actual experience with calls for service from other potential uses of the site. Any potential increase in staffing at the SFPD Bayview Station would be expected to take place throughout the R&D Variant development period with the incremental addition of new housing and new non-residential building space and their occupancy.[1207]

Although the City has no adopted staffing ratio, the existing "level of service" at the SFPD can be determined by comparing citywide police force staffing[1208] to total City population (including both residents and workers). As shown in Table IV-9 (Citywide Number of Police Officers and Estimated R&D Variant [Variant 1] Demand), using a total City population for San Francisco of 1,351,469 and a police department staffing level of 2,033 in 2005, a citywide ratio of 1 officer per 665 people was calculated.[1209] This ratio when applied to the total projected resident and employee population of the R&D Variant at build-out results in the need for an additional 62 police personnel to provide a comparable level of service.

Table IV-9 Citywide Number of Police Officers and Estimated R&D Variant (Variant 1) Demand

		Population	*Police Officers*
Citywide (2005)			
Residents		799,302	
Employees		552,167	
	Total	***1,351,469***	***2,033***
Ratio (officer to population)		1:665	
Project (2032)			
Residents		24,465	
Employees		16,635	
	Total	***41,100***	***62[a]***
Ratio (officer to population)		1:663	
	Project Total		***53***

SOURCES: The population and households data reported for San Francisco is 2005 data provided in a Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009; SFPD 2005 total staffing: PSSG District Station *Boundaries Analysis*, 2008; Proposed population and employment: Section III.C.

a. The projected number of police officers for the R&D Variant is rounded up, and most closely reflects the 1:665 ratio of the Project.

[1207] PBSJ Meeting with SFPD on April 22, 2008.

[1208] Using a Citywide police force staffing number accounts for the mixed-use nature of the Project, which would include a substantial daytime and resident or nighttime population.

[1209] City population was calculated as a 2005 population of 799,302 plus 2005 employment of 552,167; refer to Table III.C-1 (Existing Population [2005]) and Table III.C-3 (Existing Employment [2005]) of Section III.C (Population, Housing, and Employment).

The SFPD evaluates the need for additional officers by sector, and not station or district needs. The area with the R&D Variant covers two of the five sectors within the Bayview District, both of which have been identified as high demand areas. While it is unlikely that 62 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development with the R&D Variant.

Staffing increases, in and of itself, would not constitute a significant environmental impact; however, the construction of new facilities to serve the additional 62 police officers could create an environmental effect. Additional SFPD personnel needed to serve the R&D Variant would require a station from which to operate. The exact amount of space that would be needed has not yet been determined. However, using an estimate of 110 square feet per person,[1210] the additional 62 police officers would require approximately 6,800 square feet of interior building space. Additional space would be required for staff and visitor parking. According to the SFPD, there is limited excess capacity at the existing Bayview Station, and the station would not be able to accommodate all 62 additional police officers without the reconfiguration and expansion of the existing station or the construction of a new facility.[1211] In addition, the current surface parking lot is not adequate for existing personnel. Structured parking could be provided on the existing parking site.

Currently, the SFPD has no plans for expansion of its Bayview Station. According to the *Boundaries Analysis*, the Bayview Station is not among the priorities for replacement, expansion, improvement, or correction of current deficiencies. However, according to Public Safety Strategies Group (PSSG), there is a considerable amount of wasted or unused space at the Bayview Station that could be reconfigured to accommodate additional officers.[1212] If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,800 square feet (approximately 800 square feet larger than with the Project) could be constructed within the R&D Variant area, on land designated for community serving uses. As part of the R&D Variant, up to 100,000 gross square feet (gsf) of land divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. With the construction of a new facility or a suitable retrofitting or expansion of the Bayview Station, the SFPD would have ample space to accommodate the additional police officers needed to maintain the SFPD's existing level of service. Therefore, while the development of the Project may require new or physically altered police facilities in order to maintain acceptable police services, the potential impacts associated with the construction of a new facility have been addressed in this EIR and would not require further environmental review. Therefore, the anticipated development would not require new or physically altered police facilities beyond the scope of the R&D Variant in order to maintain acceptable police protection services, and, therefore, operational impacts to police protection services would be less than significant, similar to the Project.

[1210] The Bayview Station is approximately 16,000 gsf, and the capacity is about 140 officers, resulting in about 114 sf per officer.
[1211] Personal communication, John Loftus, Captain, Bayview District Station to Allison Wax, PBS&J, August 31, 2009.
[1212] PBSJ Meeting with SFPD on April 22, 2008.

Fire Protection Services

Operational impacts to fire protection and emergency medical services would be similar to the Project in as much as they would be considered less than significant. However, compared to the Project, the R&D Variant would result in a more substantial long-term daytime only population of employees at the R&D uses. Therefore, impacts on fire protection services and emergency medical could be greater than the Project, although still less than significant.

The R&D Variant would not increase the permanent resident population above that anticipated with the Project. However, as shown in Table IV-6, the R&D Variant is anticipated to generate a total of 16,635 jobs, approximately 5,905 more jobs than the Project. As such, the resident and worker population in the area at full build-out with the R&D Variant would be 41,100.[1213] The increase in the (overall) residential and (R&D Variant-specific) daytime population, combined with an increase in the intensity of physical development in the R&D Variant area, would result in new demand for fire protection and emergency medical services. Additional fire protections resources that would be required to patrol the football stadium on game days with the Project would not be required with the R&D Variant, thereby reducing that potential impact.

Building Safety

Similar to the Project all new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help to minimize the demand for future fire protection services. The R&D Variant would include an additional 2,500,000 square feet of R&D uses. These uses would be provided primarily in buildings that would have a maximum allowable height of 65 feet, although some buildings would be restricted to a maximum of 40 feet as shown on Figure IV-2. Therefore, the R&D Variant would not result in building heights greater than the Project, and impacts would be similar to the Project. Plan review for all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services. In addition, development of the R&D Variant would include expansion of the AWSS to provide water infrastructure for firefighting activities. Therefore, the R&D Variant would result in a less-than-significant operational impact to fire services due to building safety.

Response Time

As discussed with the Project, existing SFFD facilities in the Bayview neighborhood would provide adequate response times to most points within Candlestick Point and no new or physically altered fire or emergency medical facilities would be required in order to maintain an acceptable level of service. However, portions of HPS Phase II would be distant from existing fire stations including those most proximate to the site (Stations 44 and 17), which could result in the SFFD taking anywhere from 8 minutes to 14 minutes to access the HPS Phase II site in the event of an emergency. The SFFD strives to maintain a Code 3 emergency response time of 4.5 minutes, which may not be accommodated due to the distance of the

[1213] Calculated as the combined total of a resident population of 24,465 and a worker population of 16,635. This is a conservative estimate since it is not likely that the entire resident population and daytime population would be on site at the same time.

nearest station from the HPS Phase II site. As such, a new fire station located in closer proximity to the HPS Phase II site would be needed to ensure adequate response times for HPS Phase II. The SFFD does not consider response time to the furthest point of the HPS Phase II site to be acceptable, given the density of proposed development and the distance from the nearest fire station.[1214] Additionally, the R&D Variant would increase the daytime population in this area by approximately 5,905 people, which would further affect the existing SFFD resources. SFFD staff concluded that a fire station would be needed at a site that would offer more rapid response to the HPS Phase II site. Initial SFFD recommendations for such a station included providing one engine (four staff), one truck (five staff), and one ambulance (staff requirements not indicated). Both Station 9 and Station 17 include one engine and one truck, and their approximate building size is 6,100 gsf and 6,000 gsf, respectively. Neither station includes an ambulance. A new approximately 6,000-gsf SFFD station could be accommodated within the R&D Variant site, on land designated for community serving uses. As part of the R&D Variant, up to 100,000 gsf of land divided equally between Candlestick Point and HPS Phase II would be designated for community serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the R&D Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D (Transportation and Circulation), Section III.H, Section III.I (Noise and Vibration), Section III.J (Cultural Resources and Paleontological Resources), Section III.K (Hazards and Hazardous Materials), and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1215] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, the anticipated development would not require new or physically altered fire facilities. No changes to the land use program at Candlestick Point would occur, beyond the scope of the R&D Variant in order to maintain acceptable fire protection services and operational impacts to fire protection services would be less than significant, similar to the Project.

[1214] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.
[1215] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

Schools

Operational impacts to schools would be similar to the Project. The R&D Variant does not include a residential component in addition to what was considered with the Project. No changes to the land use program at Candlestick Point would occur. The additional R&D uses would not generate school-aged children at the R&D Variant site, and, therefore, impacts would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project. While the R&D Variant does not include a residential component that would result in the generation of additional permanent residents, the R&D Variant would result in the generation of approximately 5,905 additional employees at the HPS Phase II site. Although the R&D Variant would result in a substantial indirect population increase within the area, library branches that currently serve the area, including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. No changes to the land use program at Candlestick Point would occur. Therefore, the R&D Variant would result in a less-than-significant operational impact to library services, similar to the Project.

Recreation

The R&D Variant would include the construction and improvement of new parks, recreational facilities, and open space. At buildout of this Variant, approximately 327 acres of parks, open space, and recreational uses would be provided, as described in Table IV-3, which is about 9.4 acres less than proposed with the Project. The Sports Field Complex with the R&D Variant would be 69.8 acres, about 21.8 acres less than the Sports Field Complex proposed with the Project, and a total of 160.5 acres of parkland would be provided, about 12.4 acres more than proposed with the Project.

Construction impacts related to recreational facilities would be the substantially the same as those identified with the Project because the construction activities would be substantially similar, with the R&D Variant requiring slightly less construction due to the provision of about 9.4 acres less of parkland.

The R&D Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465, although 9.4 acres less of parkland would be provided. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P (Recreation) assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the R&D Variant would be 13.4, which is 0.3 less than with the Project. While this ratio is less than proposed with the Project, the R&D Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

Park Phasing

The timing of R&D Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities.

The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table IV-10 (R&D Variant [Variant 1] Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the R&D Variant). As this table indicates, the park-to-population ratio would not drop below 8.4 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Table IV-10 demonstrates that adequate parkland would be provided during each stage of development. However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

Table IV-10 R&D Variant (Variant 1) Residential Units and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*
Existing	256	1,113[a]	120.2	108
Phase 1	3,160	7,363[b]	135.8	18.4
Phase 2	5,165	12,034[b]	147.1	12.2
Phase 3	7,670	17,871[b]	150.6	8.4
Phase 4	10,500	24,465[b]	327.0	13.4

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Employment, and Housing). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.
b. Calculated as 2.33 people per residential unit.

Senate Bill 792 (SB 792) (refer to Appendix P2 [SB 792]) was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002,* the *Hunters Point Shipyard Public Trust Exchange Act,* and *Public Resources Code* Section 5006.8, and consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. These additional acres would widen the park at

in an area where the CPSRA boundary currently runs very close to the shoreline, creating a very narrow "pinch point" in the park. The additional acreage would thus create a buffer between development and the shoreline and improve the recreational value of this section of the park. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres, which is the same as the Project.

While the reconfiguration of CPSRA would remove a net of 29.2 acres from the park, all of that acreage is degraded or unimproved (and not maintained) and does not provide substantial recreation opportunities to the community. Most of the land that would be removed from CPSRA is either currently used for stadium parking or is directly adjacent to Harney Way. The reconfiguration would add 5.7 acres of new parkland in The Last Port, The Neck, and The Heart of the Park, all areas that are currently developed and actively used that have high value as recreational resources. This additional acreage would widen the park at this important point, increasing its capacity for new users. Although there would be a net decrease in the total area of the CPSRA, that portion of the CPSRA that is currently developed and used for recreational purposes would be further expanded (by 5.7 acres) and improved.

Moreover, the R&D Variant would provide substantial improvements throughout the CPSRA. These improvements, which are described at length in the discussion of Impact RE-2, include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), the provision of habitat and opportunities for environmental education, "Eco-Gardens," and salt-marsh restoration. Figure III.P-8 shows the existing unimproved and improved areas of the CPSRA and indicates where land would be removed or added relative to the existing CPSRA uses. These improvements would turn portions of the Park that are used for Candlestick Park stadium parking or are undeveloped and underutilized into vibrant parts of the CPSRA and of the overall network of parks. Currently improved parts of the CPSRA, such as The Heart of the Park, The Point, The Neck, and The Last Port, would also be improved. Overall, the reconfiguration and improvements would enhance park aesthetics and landscape ecology; provide connections throughout the CPSRA and the other parks; and provide direct access to the Bay and the Bay shoreline for walking, swimming, fishing, kayaking, and windsurfing. The Variant's proposed reconfiguration of the CPSRA, therefore, would not adversely affect the park's existing recreational facilities and opportunities.

The improvement and development of the CPSRA is expected to increase usage of CPSRA by visitors. While the number of additional visitors cannot be accurately predicted at this time, the Project's improvement will increase the amount of land at CPSRA that provides recreational opportunities (as discussed above), and will thus enable the park to accommodate the new demand. Moreover, the agreement between CDPR and the City or the Agency, providing for the reconfiguration of CPSRA, would also provide at least $10 million in funding for operation and maintenance of the park, further enabling the park to accommodate increased demand.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the R&D Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would

experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). The Variant would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the R&D Variant would be substantially similar to the Project.

Utilities

Water

The operational activities of the R&D Variant would be similar to those of the Project in as much as there would be temporary, daytime populations at the R&D Variant site and full-time residential populations that generate retail water demand from San Francisco Public Utilities Commission (SFPUC).

With the R&D Variant, the football stadium proposed with the Project for the HPS Phase II site would be replaced by 2,500,000 square feet of additional R&D space. The R&D Variant would have the same number of residential units as the Project, but would increase the temporary, daytime population of employees. As shown in Table IV-11 (R&D Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance [mgd]), the R&D Variant would consume approximately 1.99 million gallons per day (mgd) of water. With existing water use at the CP-HPS Phase II site of 0.3 mgd, the net change in water demand with the R&D Variant would be an increase of 1.69 mgd, an increase of 0.32 mgd over the Project.

Table IV-11 R&D Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance (mgd)

Land Use	*Candlestick Point*	*Hunters Bay Shipyard*	*Total*
Residential	0.61	0.22	0.83
Hotel	0.05	0.00	0.05
Office	0.04	0.02	0.06
R&D	0.00	0.71	0.71
Neighborhood Retail	0.02	0.02	0.03[a]
Regional Retail	0.08	0.00	0.08
Community Uses	0.01	0.01	0.02
Football Stadium	0.00	0.00	0.00
Performance Venue	0.01	0.00	0.01
Subtotal	*0.82*	*0.98*	*1.80*[a]
Parks and Open Space	0.05	0.14	0.19
Total Demand	***0.88***[a]	***1.13***[a]	***1.99***[a]
Existing Demand			0.30
Net Change in Demand			***1.69***

SOURCE: PBS&J, Candlestick Point–Hunters Point Shipyard Phase II Water Supply Assessment, October 2009.

a. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals used in this table. These entries are correct and consistent with Table 4-2 of the Water Supply Assessment.

As with the Project, sufficient treatment capacity would continue to be available to meet the likely future water treatment needs of the entire Regional Water System, and thereby meet retail demand for water treatment, including the net increase of 1.69 mgd for the R&D Variant. As the current and planned treatment capacity of existing RWS water treatment facilities is sufficient to serve the R&D Variant, implementation of this variant would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant, similar to the Project.

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the R&D Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1216] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1217,1218] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018, through 2030 to meet projected demand. The R&D Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

[1216] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.
[1217] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.
[1218] SFPUC, Urban Water Management Plan, 2005.

Wastewater

The construction impacts of the R&D Variant would be substantially similar to the Project because the construction activities required with both would be similar.

The operational activities of the R&D Variant would be similar to those of the Project in as much as there would be temporary, daytime populations at the R&D Variant site that require wastewater utilities that are connected to the City's systems. The R&D Variant would replace or upgrade existing wastewater infrastructure within the R&D Variant site.

With the R&D Variant, the football stadium proposed with the Project for the HPS Phase II site would be replaced by 2,500,000 square feet of additional R&D space. The R&D Variant would have the same number of residential units as the Project, but would increase the temporary, daytime population of employees. As shown in Table IV-12 (R&D Variant Wastewater Generation), the R&D Variant would result in the generation of approximately 1.35 mgd of wastewater, an increase of 0.17 mgd of wastewater over the Project.

Table IV-12 R&D Variant Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed as % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total R&D Variant (mgd)*
Residential	95%	0.58	0.21	0.79
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.40	0.40
Hotel	57%	0.03	0	0.03
Football Stadium	95%	0	0	0
Performance Venue	95%	0.01	0	0.01
Total		***0.71***	***0.64***	***1.35***

SOURCE: Arup, October 15, 2009.

The 1.35 mgd of wastewater projected for operation of the R&D Variant would be transported via new or expanded conveyance systems within the R&D Variant site and existing mains to the Southeast Water Pollution Control Plant (SWPCP).[1219] The existing wastewater/stormwater conveyance lines between the HPS Phase II site and the SWPCP are sized to accommodate both dry- and wet-weather flows. Wastewater from the R&D Variant site would flow into the Hunters Point tunnel sewer (from the HPS Phase II site) and the Candlestick and Hunters Point tunnel sewers (from the Candlestick Point site). The] Hunters Point tunnel sewer has an average dry-weather flow of 6 mgd (4,167 gallons per minute [gpm]) and a design capacity of 120 mgd (83,333 gpm) (refer to Table IV-13 [Sewer Trunk Capacity and R&D Variant Maximum Peak

[1219] *Candlestick Point/ Hunters Point Shipyard Infrastructure Concept Report* (October 26, 2009) prepared by Winzler & Kelly Consulting Engineers.

Flows]).[1220] Peak dry-weather flow capacities can be calculated by multiplying the average gallons-per-minute flow by a peaking factor. For purposes of this analysis, a conservative peak factor of 3.0 was used, which yields a maximum flow capacity of 12,501 gpm for the Hunters Point tunnel sewer. Projected maximum peak flows from the HPS Phase II development with the R&D Variant, based on a peaking factor of 3.0, would be approximately 1,333 gpm.[1221] The remaining capacity of the Hunters Point tunnel sewer is 69,499 gpm. Therefore, the addition of approximately 1,333 gpm of peak flow from HPS Phase II with the R&D Variant would be accommodated within the remaining capacity (69,499 gpm) of the Hunters Point tunnel sewer. Stormwater flowing from the Candlestick Point Development (2,500 gpm maximum) would be the same with the R&D Variant as the Project as the land use program would not change. Therefore, the R&D Variant would result in a less-than-significant impact to wastewater conveyance, similar to the Project.

Table IV-13 Sewer Trunk Capacity and R&D Variant Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Variant Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With R&D Variant*
Candlestick tunnel sewer	34,722	1,736	5,208	1,479	28,035[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	1,333	69,499[f]

SOURCE: Bayside Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that will be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project will be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that will be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project will be somewhat greater than 69,853 gpm.

Because the existing conveyance infrastructure could accommodate the additional flows from the HPS Phase II development in addition to existing flows even during periods of peak flows, no expansion of the off-site wastewater conveyance lines would be required as a result of the R&D Variant development.

The contribution of the R&D Variant to the Bayside system represents a small percentage of its available capacity and would be accommodated by the existing infrastructure. Although development of the R&D Variant would increase wastewater flows (as intermittent flows from Candlestick Park stadium would be replaced by year-round flows from mixed-use development), the provision of separate stormwater and sewer systems would reduce overall wet-weather volumes to the Combined Sewer System.

The land use program and associated stormwater flows from the Candlestick Point site would be the same with the R&D Variant as with the Project. Therefore, treatment of stormwater would also be the same as with the Project. Stormwater from the HPS Phase II site is collected and discharged to the Bay via a

[1220] San Francisco Public Utilities Commission, Bayside Operations Plan, 2002.
[1221] Calculated as 0.64 MGD/24 hours/60 minutes * 3.0*1,000,000.

separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With the R&D Variant, stormwater would continue to be collected and treated in a separate stormwater system, and no stormwater runoff would be contributed to the Combined Sewer System during wet weather. Although development with the R&D Variant at the HPS Phase II site would result in a net increase in wastewater flows of 1.35 mgd, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP. The increase in wastewater generation with the R&D Variant would incrementally contribute to the total amount of wet-weather flows that are collected and treated at the SWPCP, the North Point Wet Weather Facilities (NPWWF), and the Bayside Wet Weather Facilities. When the combined storage and treatment capacity of those facilities are exceeded, wastewater from the R&D Variant development could be discharged, along with other wet-weather flows from the combined system, via the CSOs located around the perimeter of San Francisco. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact would be less than significant, similar to the Project.

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the R&D Variant would be treated at the SWPCP wastewater treatment plant and the SFPUC, who operates the SWPCP wastewater treatment plant, is required to comply with waste discharge requirements (WDRs) set by the RWQCB, which specify the allowable levels of pollutants in discharges from the facility. Compliance with any applicable WDRs, as monitored and enforced by the SFPUC, would ensure that the R&D Variant does not exceed the applicable wastewater treatment requirements of the RWQCB, and this impact would be less than significant, similar to the Project.

Solid Waste

Construction wastes with the R&D Variant, including demolition and hazardous wastes, would be similar to that generated with the Project because the materials used for construction would be substantially similar for both. Construction waste would be sorted, prior to disposal, to ensure that all recyclable materials are salvaged from the waste that is ultimately taken to a landfill. Incorporation of mitigation measure MM UT-5a (Construction Waste Diversion Plan) would ensure that impacts to solid waste during construction are reduced to a less-than-significant level.

Operational

Operational impacts of the R&D Variant would be substantially similar to the Project because the amount and type of solid waste generated would be similar, recycling activities would be implemented with both projects, and neither project would result in the exceedance of current landfill capacities. As shown in Table IV-14 (R&D Variant Solid Waste Generation), the R&D Variant would result in approximately 9,143.3 tons of waste at full build-out of the HPS Phase II site, an increase of approximately 1,723 tons over the Project, for a total R&D Variant annual waste generation of 22,225 tons. This total waste stream would constitute approximately

Table IV-14 R&D Variant Solid Waste Generation

Use	Generation Factor (per day)	Candlestick Point			HPS Phase II			Total		
		Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year or per Total Number of Events[a]
Residential	5.653 lbs/unit	7,850 units	22.2	8,103	2,650 units	7.5	2,737.5	10,500 sf	29.7	10,840.5
Retail	0.02600411 lbs/sf	760,000 sf	9.9	3,613.5	125,000 sf	1.6	584.0	885,000 sf	11.5	4,197.5
Office	0.006 lbs/sf	150,000 sf	0.5	182.5	0	0	0	150,000 sf	0.5	182.5
Hotel	0.0108 lbs/sf	150,000 sf	0.8	292.0	0	0	0	150,000 sf	0.8	292.0
R&D	0.006 lbs/sf	0	0	0	5,000,000 sf	15	5,475	5,000,000 sf	15	5,475
Performance Venue	2.23 lbs/seat	10,000 seats	5.6[b]	836.3[c]	0	0	0	10,000 seats	5.6	836.3[c]
Stadium	2.23 lbs/seat	0	0	0	0	0	0	0	0	0
Art Center	0.006 lbs/sf	0	0	0	255,000 sf	0.8	292	255,000 sf	0.8	292.0
Community Facilities	0.006 lbs/sf	50,000 sf	0.15	54.8	50,000 sf	0.15	54.8	100,000 sf	0.3	109.6
Total				***13,082***			***9143***			***22,225***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

a. Calculated by adding the horizontal columns, rather than calculating total number of units by the generation rate.
b. The Performance venue is projected to be 50 percent attendance.
c. Assumes 150 events per year at 50 percent attendance. Attendance estimate is based on CABER, Towson University & Sage Policy Group, Inc., *The Economic Feasibility of a Montgomery County, MD Arena*, June 2007.
d. Assumes a sold-out event with a 5 percent "no-show" rate.
e. Assumes 12 sold-out games and 20 other sold-out stadium events per year.

3.6 percent of the City's total waste stream.[1222] The increase in solid waste generation associated with the R&D Variant development would not be substantial in the context of citywide solid waste infrastructure demand.

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste. The City has a contract with Altamont Landfill to accept the City's waste through 2014. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1223]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, its permit expires three years earlier, in January 2029.[1224] Demolition activities, which generate construction debris, are expected to conclude in 2028 at Candlestick Point and in 2023 at HPS Phase II, one year before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste for new construction, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the R&D Variant on solid waste would be further reduced. The impact of the construction waste generated by the R&D Variant on the capacity of the Altamont Landfill would be less than significant.

Typical municipal solid waste has a landfill density of 739 pounds per cubic yard.[1225] Using this density factor, 45.7 million cubic yards of remaining capacity at the Altamont Landfill would be equivalent to 33.7 million tons of remaining capacity. The contribution of 22,472 tons annually with the R&D Variant would represent 0.06 percent of the remaining capacity of the Altamont Landfill. Additionally, approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1226] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1227] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes. The City has

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[1222] California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Accessed online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008. 627,157 total tons of solid waste in 2007.
[1223] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.
[1224] CIWMB, 2009.
[1225] http://wasteage.com/mag/waste_municipal_solid_waste/. Accessed September 29, 2009.
[1226] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Available at <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008.
[1227] San Francisco, *Waste Characterization Study: Final Report.* 2008.

prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals. These strategies would be utilized to achieve the City's overall waste reductions goals. The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

All residents and businesses with the R&D Variant would be expected to comply with the City's waste and recycling ordinances. On the basis of the landfill capacity and diversion strategies noted above, and with implementation of mitigation measure MM UT-7a (Site Waste Management Plan), the R&D Variant would result in a less-than-significant impact to solid waste, similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into the Project site. This could include a new substation within the project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the R&D Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the R&D Variant, similar to the Project.

Energy

Construction

Construction activities of the R&D Variant would be similar to the Project as the construction equipment usage, types of energy resources needed, type of construction activities, and construction timeline would be similar.

The construction activities proposed with the R&D Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, construction activities would not be large in comparison to a project of a similar size and with similar land uses, and the R&D Variant would result in a less-than-significant impact, similar to the Project.

Operation

Electricity

The operational impacts of the R&D Variant would be similar to the Project because the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the R&D Variant would result in the demand for more electricity than the Project; therefore, impacts would be greater (about 25 percent greater). As discussed in Section III.R (Energy), the operational impacts of a project are considered significant if it encourages activities that result in the use of large amounts of energy or uses such resources in a wasteful manner. The criterion for this impact considers whether the R&D Variant would result in a large increase in electricity consumption. As shown below in Table IV-15 (R&D Variant Electricity Demand from Building Envelopes [MWh]), the R&D Variant would be expected to result in an electricity demand of approximately 41,945 Megawatt hours (MWh). While about 4 percent more than the Project, this would not be a large overall increase in consumption over the existing conditions of 9,990 MWh; however, two uses (residential and R&D) would account for 90 percent of the increase in demand for electricity at the site. R&D uses would be the largest source of electricity consumption at HPS Phase II, while residential units would be the largest source of electricity consumption at Candlestick Point. Because R&D uses result in heavy electricity consumption during peak daytime hours (largely due to HVAC, lighting, and the operation of office equipment), the R&D Variant could generate high levels of peak demand, similar to the Project.[1228]

Taking the R&D Variant's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as well as the level of development proposed, the electricity increase associated with the R&D Variant would not be considered large.

The City's threshold also considers whether the R&D Variant's energy consumption would be wasteful. The efficiency measures proposed under the R&D Variant would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the R&D Variant's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the R&D Variant's voluntary implementation of LEED® ND standards. However, because the R&D Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the R&D Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less

[1228] Although the R&D Variant would include on-site electricity infrastructure, local delivery infrastructure is supplied by larger transmission lines, substations, and generation facilities owned by PG&E and other entities. Adding new connections to the overall power grid, thereby increasing demand on the grid, contributes to the need for periodic infrastructure upgrades. More importantly, because electricity cannot be stored once generated, the need for development of additional electricity generation sources is largely dependent on the peak level of conveyance. Designing electricity infrastructure is similar to designing highways, which are sized to convey rush-hour demand.

Table IV-15 R&D Variant Electricity Demand from Building Envelopes (MWh)

		Candlestick Point			HPS Phase II			Project Site Total			
Type of Use	*Electricity Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]*	*Development Program[b]*	*MWh Consumed Annually, 2008 Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program[b]*	*MWh Consumed Annually, Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program*	*MWh Consumed Annually, Title 24 Standards*	*MWh Consumed Annually, with 15% Reduction*	*Percent of Total Electricity by Land Use*
Residential Units	1.7350[d]	7,850	13,620	11,577	2,650	4,598	3,908	10,500	18,218	15,485	37%
Retail	0.0027	635,000	1,715	1,457	—	0	0	635,000	1,715	1,457	3%
Neighborhood Retail	0.0027	125,000	338	287	125,000	338	287	250,000	675	574	1%
Office	0.0052	150,000	780	663	—	0	0	150,000	780	663	2%
R&D	0.0052	—	0	0	5,000,000	26,000	22,100	5,000,000	26,000	22,100	53%
Hotel	0.0027	220	1	1	—	0	0	220	1	1	0%
Artist Studios/ Center	0.0052	—	0	0	255,000	1,326	1,127	255,000	1,326	1,127	3%
Community Space	0.0052	50,000	260	221	50,000	260	221	100,000	520	442	1%
Arena	0.0015	75,000	113	96	—	0	0	75,000	113	96	0%
Total			***16,825***	***14,301***		***32,522***	***27,643***		***49,348***	***41,945***	***100%***

SOURCES:

R&D Variant electricity demand was estimated based on the Applicant's commitment to achieve 15 percent energy reductions below Title 24 standards and use ENERGY STAR appliances in all residential units.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor was derived by subtracting the "Plug-in" factor from the "Electricity Delivered, Total" column (in the "15 percent Better than Title 24 2008 and ENERGY STAR Appliances" row). The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. Based on buildout floor areas provided in Table IV-3 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

than significant. The City's significance criterion also considers whether a project's energy consumption would be wasteful. The efficiency measures proposed with the R&D Variant would result in less electricity consumption than a project that would not implement such measures. These measures include installation of ENERGY STAR appliances, a measure aimed at reducing residential electricity consumption, which as discussed in the preceding paragraph, is a land use with correspondingly high energy consumption. Therefore, the R&D Variant has demonstrated a good faith effort to avoid wasteful consumption of energy for residential uses. In addition, as discussed in the preceding paragraph, the R&D Variant Applicant would be required to comply with the City's Green Building Ordinance and has committed to pursuing LEED® credits.[1229] Thus, electricity consumption with the R&D Variant development would be considered efficient and not wasteful. Operational electricity impacts would be less than significant, similar to the Project.

Natural Gas

The operational impacts of the R&D Variant would be similar to the Project as the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the R&D Variant would result in the demand for almost twice the natural gas demand of the Project.

Table IV-16 (R&D Variant Natural Gas Demand, Baseline [MBtu]) presents the annual natural gas use for the R&D Variant, estimate based on land use and minimal compliance with Title 24 standards as well as the R&D Variant Applicant's preliminary commitment to reduce energy use to 15 percent below Title 24 standards. The natural gas demand associated with the R&D Variant would be approximately 98,563 MBtu, in comparison to a similarly sized project that would not include the 15 percent reduction below 2008 Title 24 standards and which would result in consumption of approximately 116,670 MBtu of natural gas use annually.

However, this is approximately 35,300 MBtu more than the Project.

The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be over four times higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly five times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the R&D Variant would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

However, because the R&D Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the R&D Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

All natural gas impacts would be less than significant, similar to the Project.

[1229] Savings associated with these features cannot be calculated until the designs of individual buildings have been completed.

Table IV-16 R&D Variant Natural Gas Demand, Baseline (MBtu)

Type of Use	Natural Gas Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]	Candlestick Point			HPS Phase II			Project Site Total			
		Development Program[b]	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Development Program[b]	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Development Program	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Percent of Total by Land Use
Residential Units	0.0360[d]	7,850	283	240	2,650	95	81	10,500	378	321	0%
Retail	0.0048	635,000	3,048	2,591	—	—	—	635,000	3,048	2,591	3%
Neighborhood Retail	0.0048	125,000	600	510	125,000	600	510	250,000	1,200	1,020	1%
Office	0.0200	150,000	3,000	2,550	—	—	—	150,000	3,000	2,550	3%
R&D	0.0200	—	—	—	5,000,000	100,000	85,000	—	100,000	85,000	86%
Hotel	0.0345	220	8	6	—	—	—	220	8	6	0%
Artist Studios/ Center	0.0200	—	—	—	225,000	4,500	3,825	225,000	4,500	3,825	4%
Community Space	0.0200	50,000	1,000	850	50,000	1,000	850	100,000	2,000	1,700	2%
Arena	0.0243	75,000	1,823	1,549	—	—	—	75,000	1,823	1,549	2%
Total			***9,761***	***8,297***		***106,909***	***90,266***		***116,670***	***98,563***	***100%***
Percent of Total			***8%***			***92%***			***100%***		

SOURCES:

Baseline R&D Variant natural gas demand was estimated based on land use and basic compliance with 2008 Title 24 standards.

a. The natural gas factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Overall Based on 2008 Title 24" column. The factors were converted from kBtu to MBtu.

b. Based on buildout floor areas provided in Table IV-3 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The natural gas factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor is in the "Natural Gas Delivered, Total" column and the "Minimally Title 24 Compliant (2008)" row. The factor was converted from kBtu to MBtu (1 MBtu = 1,000 kBtu).

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

Similar to the Project, the R&D Variant would increase trips to and from the site, increasing the use of petroleum fuels. However, this consumption would not be wasteful because (1) the R&D Variant proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements, (2) the R&D Variant would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips, and (3) the R&D Variant would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as the overall trip lengths. Therefore, the R&D Variant would result in a less-than-significant impact due to the wasteful use of transportation-related fuels, similar to the Project.

Greenhouse Gas Emissions

As shown in Table IV-3, the R&D Variant would replace the 49ers stadium proposed with the Project with an additional 2,500,000 gsf of R&D space (total R&D uses would equal 5,000,000 gsf). Construction impacts would be substantially similar to the Project. Operational impacts would be similar but greater than those identified under the Project as the proposed additional R&D development would result in greater annual GHG emissions than the stadium. The methodologies used to estimate GHG emission for the R&D Variant are the same as described in Section III.S (Greenhouse Gas Emissions) for Project GHG emissions.

Construction

- As stated above, overall construction impacts of the R&D Variant (Variant 1) with respect to climate change and GHG emissions would be similar to the Project. Construction activities would occur from the use of construction equipment, workers commuting, and soil hauling activities. The GHG emissions associated with the construction activities are short-term in duration and would be a total of 129,274 tonnes CO_2e. When this is distributed over an anticipated time schedule of 20 years, approximately 6,464 tonnes per year would be emitted. Since these emissions are short in duration and small in comparison to the overall construction and mining emissions for the San Francisco Bay Area Air Basin GHG emission inventory, the R&D Variant GHG emissions for construction would be less than significant similar to the Project.

Operation

Operational impacts to climate change and GHG emissions would be substantially similar to the Project. Under the R&D Variant, the football stadium proposed under the Project would be replaced with 2,500,000 square feet of additional R&D space at the HPS Phase II site. Development of Candlestick Point would be similar to the Project except for a slight increase in emissions associated with mobile sources. Table IV-17 (R&D Variant Annual GHG Emissions) shows the emissions for Candlestick Point under the R&D Variant. Due to the additional building space and additional traffic associated with the R&D space added, the GHG emissions at HPS Phase II site would be slightly higher. The breakdown in operational GHG emissions for HPS Phase II is shown in Table IV-17.

The operational emissions were compared to ARB Scoping Plan No Action Taken Scenario which assumes the site would be developed without implementation of conceptual design features and using regulations in place at the time of the Scoping Plan development. The R&D Variant shows large reductions in GHG emissions due to the mitigation measures that will be implemented. The comparison of the R&D Variant GHG emissions to the ARB Scoping Plan No Action Taken scenario is shown in Table IV-18 (Annual GHG

Emissions Comparison of R&D Variant and ARB Scoping Plan No Action Taken Scenario). This shows that due to the improvement in electricity carbon intensity and energy efficiency of the buildings residential GHG emissions would have a 20 percent reduction in emissions and non-residential buildings would have a 17 percent reduction in emissions. Municipal sources are anticipated to be 7 percent lower than the ARB Scoping Plan No Action Taken as a result of reductions in electricity carbon intensity. Mobile source emissions associated with the R&D variant are a result of trip reductions in automobiles and vehicle emission efficiency regulations resulting in 57 percent reductions compared to the ARB Scoping Plan No Action Taken scenario.

Table IV-17 R&D Variant Annual GHG Emissions

Source	*Candlestick Point (tonnes CO_2e/year)*	*Hunters Point Shipyard Phase II (tonnes CO_2e/year)*	*Total (tonnes CO_2e/year)*
Residential	19,035	6,642	25,677
Non-Residential	4,263	23,155	27,418
Mobile	77,586	42,332	119,918
Municipal	1,793	860	2,653
Area	161	56	217
Waste	532	506	1,038
Transit Area	865	865	1,730
Total (annual emissions)	***104,234***	***74,416***	***178,651***

SOURCE: ENVIRON, 2009.

Table IV-18 Annual GHG Emissions Comparison of R&D Variant and ARB Scoping Plan No Action Taken Scenario (tonnes CO_2e/year)

Source	*No Action Taken*	*R&D Variant*	*Difference*	*Percent Difference*
Residential	32,286	25,677	6,609	20%
Non-Residential	33,025	27,418	5,607	17%
Mobile	277,459	119,918	157,541	57%
Municipal	2,860	2,653	207	7%
Area	217	217	0	0%
Waste	1,038	1,038	0	0%
Transit Service	2,884	1,730	1,154	40%

SOURCE: ENVIRON October 2009. Climate Change Technical Report Candlestick Point-Hunters Point Shipyard Phase II Redevelopment Plan. Table 4-9 (Appendix S to this EIR)

Emissions associated with new public transportation added to the development would have a 40 percent reduction due to the use of diesel-hybrid buses. Since transportation is one of the largest emissions categories in both the statewide and local GHG emissions inventory, the amount of reduction is substantial in the overall reductions anticipated for the R&D Variant. Furthermore, most of the other larger categories also result in substantial reductions in emissions. This indicates that the R&D Variant would not impede the achievement of San Francisco's GHG emission reduction ordinance nor the statewide emission reductions required under AB 32. Therefore, the R&D Variant is less than significant with respect to the cumulative impacts of climate change and GHG emissions.

BAAQMD Draft GHG Thresholds

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Variant's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Variant and Project.

With mitigation, the R&D Variant-related operational emissions of 178,651 tonnes per year result in 4.4 tonnes CO_2e per service population per year based on a service population of 40,507 (this accounts for 23,869 net new residents and all 16,638 jobs). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change.

IV.C VARIANT 2: HOUSING VARIANT (NO STADIUM—RELOCATION OF HOUSING)

IV.C.1 Overview

The Housing Variant assumes that the 49ers Stadium would not be constructed, and instead, housing would be relocated to the HPS Phase II site. Residential development would be reduced at Candlestick Point and increased at HPS Phase II in comparison to the Project, and the total 10,500 housing units would be the same as with the Project. All other uses on Candlestick Point and HPS Phase II would be constructed at the same locations and at the same intensities proposed with the Project. Neighborhood retail would be distributed differently than the Project to serve residential uses on HPS South district; however, the total amount of neighborhood retail is the same as the Project. Parks and sports field areas at HPS Phase II would be increased compared to the Project because the total development area for residential uses would be reduced.

Table IV-19 (Housing Variant Land Use Summary) presents the land use summary for the Housing Variant. Figure IV-7 (Housing Variant Land Use Plan) illustrates the proposed Housing Variant land uses.

Table IV-19 Housing Variant Land Use Summary

Land Use	*Candlestick Point*	*HPS Phase II*	*Total*
Residential			
Residential Density Range I (15 to 75 units per acre)	970	1,540	2,510
Residential Density Range II (50 to 125 units per acre)	3,670	1.905	5,575
Residential Density Range III (100 to 175 units per acre)	1,220	265	1,485
Residential Density Range IV (175 to 285 units per acre)	640	290	930
Total (units)	***6,500[a]***	***4,000[b]***	***10,500***
Retail			
Regional Retail (gsf)	635,000	N/A	635,000
Neighborhood Retail (gsf)	125,000	125,000	250,000
Total (gsf)	***760,000***	***125,000***	***885,000***
Office (gsf)	150,000	N/A	150,000
Research & Development	***N/A***	***2,500,000***	***2,500,000***
Hotel (gsf)	150,000	N/A	150,000
Rooms	220	N/A	220
Artists' Studios/Art Center (gsf)	N/A	255,000	255,000
Community Services (gsf)[c]	50,000	50,000	100,000
Parks & Open Space			
New Parks (acres)	8.1	149.9	158.0

Table IV-19 Housing Variant Land Use Summary

Land Use	*Candlestick Point*	*HPS Phase II*	*Total*
New Dual-Use Sports Fields/Multi-Use Lawn and Stadium Parking and Waterfront Recreation (acres)	N/A	94.7	94.7
Existing State Parkland Improved (acres)	91.0	N/A	91.0
New State Parkland (acres)	5.7	N/A	5.7
Total (acres)	***104.8***	***244.6[d]***	***349.4***
Marina (slips)	N/A	300	300
Performance Venue/Arena (gsf)	75,000	N/A	75,000
Seats	10,000	N/A	10,000
Parking (spaces)			
Residential (structured)	6,500	4,000[e]	10,500
Commercial (structured)	2,346	3,778	6,124
General and Commercial (on-street)	1,360	1,298	2,658

SOURCE: Lennar Urban, 2009.

a. 1,350 units less than the Project (moved to HPS Phase II).

b. 1,350 units more than the Project (moved from Candlestick Point).

c. . Community facilities parcels are intended to provide the existing BVHP community and the future Project community with dedicated land for uses designed to provide, preserve, and leverage such critical local resources as social services, education, the arts, other community services (including public safety facilities such as fire and police stations), and facilities for the benefit of senior citizens. Additional uses proposed for the community facilities parcels such as retail, services, offices, and R&D space, beyond the 100,000 proposed for community facilities, would be absorbed within the retail or R&D program proposed in HPS Phase II. Total uses would not exceed those amounts identified in this table.

d. Parks and sports field areas at HPS Phase II would be increased compared to the Project because the total development area for residential uses would be reduced.

e. Residential parking at HPS Phase II would be increased compared to the Project to provide parking for the additional residential units.

IV.C.2 Project Objectives

The objectives for the Housing Variant would be the same as for the Project. In particular, the Housing Variant was prepared to address the following portion of Objective 1:

- Implement the CP-HPS Development Plan with public benefits, whether or not the 49ers decide to remain in San Francisco, including developing alternate uses for the stadium site on the Shipyard Property that are consistent with the overall CP-HPS Development Plan objectives.

A full list of Project objectives is provided in Section II.D of this EIR.

SOURCE: Lennar Urban, 2009.

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FIGURE IV-7 Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT LAND USE PLAN

IV.C.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While many of these components of the Project would also apply to this variant, the discussion below outlines the principal differences.

Candlestick Point

The land use program outlined in the Chapter II for Candlestick Point would be the same for this Housing Variant, with fewer housing units. The discussion below is focused on the changes that would occur at HPS Phase II.

Districts

As discussed in Chapter II, the HPS Phase II land use plan would consist of four districts: the HPS Village Center, HPS North, R&D, and HPS South. The changes proposed with the Housing Variant compared to the Project include residential and neighborhood commercial land uses for the HPS South district and a small reduction in neighborhood commercial uses in other HPS Phase II districts. All other land uses within the HPS Phase II districts would be the same as the Project, as described in detail in Chapter II. Land uses on the Candlestick Point site would be the same as with the Project, however the density of residential uses would be lower. A summary of the development in HPS Phase II proposed with the Housing Variant is provided in Table IV-20 (Housing Variant HPS Phase II Land Use Summary). Figure IV-8 (Housing Variant Maximum Building Heights) illustrates the maximum building heights for the Housing Variant.

The Hunters Point Shipyard South

With the Housing Variant, the 69,000-seat National Football League stadium proposed with the Project would not be constructed. Instead, the Housing Variant would result in construction of 1,350 dwelling units at Density Range I and II in the HPS South district. The Project includes no residential uses in this district. In addition, with Variant 2, the HPS South district would develop 25,000 gsf of neighborhood retail, while the Project would not develop any neighborhood retail adjacent to the stadium. As presented in Table IV-21 (Housing Variant HPS Phase II Parks and Open Space), the Sports Field Complex proposed with the Housing Variant would be 65.9 acres, 6.2 acres more than the Project.

Hunters Point Shipyard North

Other than the amount of neighborhood retail that would be developed, the land uses proposed in the HPS North district are the same as the Project. Development in this area would include 18,000 gsf of neighborhood retail uses, which is 7,000 gsf less than what is proposed for the Project.

Hunters Point Shipyard Village Center

Other than the amount of neighborhood retail that would be developed, the land uses proposed in the HPS Village Center district would be the same as the Project. Development in this area would include 20,000 gsf of neighborhood retail uses, this is 5,000 gsf less than what is proposed for the Project.

Table IV-20 Housing Variant HPS Phase II Land Use Summary

District	*Net Acres*[a]	*Dwelling Units*[b]	*Density*	*Neighborhood Retail (gsf)*	*Artist Space (gsf)*	*R&D (gsf)*	*Community Services (gsf)*	*Total Commercial (gsf)*	*City Parks (acres)*
Hunters Point Shipyard North	27.30	2,085	I, II, III, IV	18,000[c]	0	0	0	18,000	19.9
Hunters Point Shipyard Village Center	7.55	125	I	20,000[d]	255,000	0	0	275,000	15.6
Research & Development	26.22	440	I, II	62,000[e]	0	2,000,000	0	2,062,000	25.3
Hunters Point Shipyard South	47.06[f]	1,350[g]	I, II	25,000[h]	0	500,000	50,000	575,000	183.8
Total	***108.13***	***4,000***[g]	***N/A***	***125,000***	***255,000***	***2,500,000***	***50,000***	***2,930,000***	***244.6***[i]

SOURCE: Lennar Urban, 2009.

a. Net Acreage excludes the street network.

b. 1,540 Residential Density Range I (15 to 75 units per net acre)
1,905 Residential Density Range II (50 to 125 units per net acre)
265 Residential Density Range III (100 to 175 units per net acre)
290 Residential Density Range IV (175 to 285 units per net acre)
4,000 Total units

c. 7,000 gsf less than the Project.

d. 5,000 gsf less than the Project.

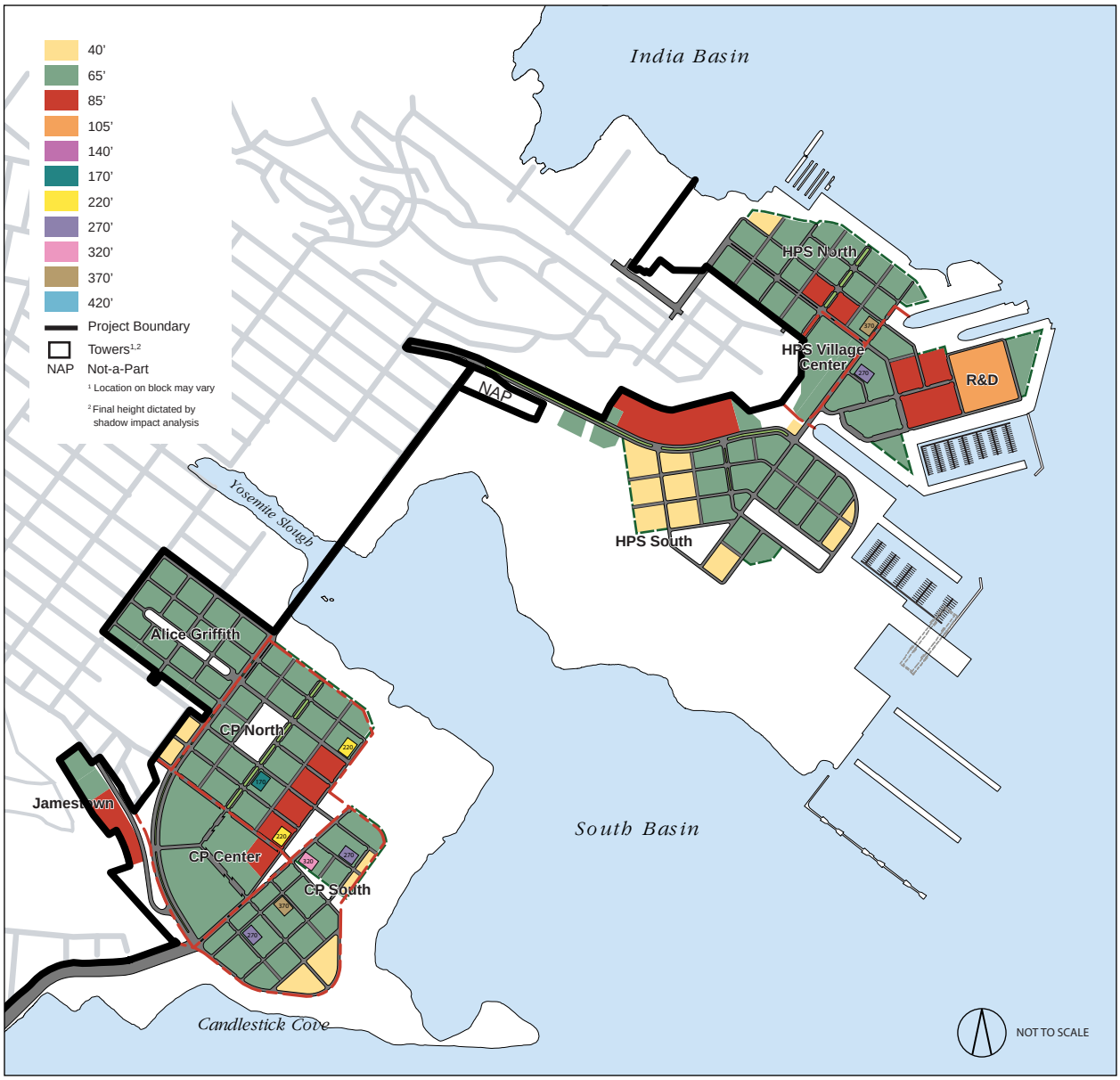
e. 13,000 gsf less than the Project.

f. The net acreage of the HPS South district would be increased compared to the Project (32.26 acres with stadium).

g. 1,350 units more than the Project.

h. 25,000 more than the Project.

i. Parks and sports field areas at HPS Phase II would be increased compared to the Project because the total development area for residential uses would be reduced.



SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT MAXIMUM BUILDING HEIGHTS

FIGURE IV-8

Table IV-21 Housing Variant HPS Phase II Parks and Open Space		
Park/Open Space		***Acres***
New Parks		
Northside Park		12.8
Waterfront Promenade		32.4
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		44.9
Grasslands Ecology Park at Parcel E-2		37.7
Hunters Point South Park		3.7
	Subtotal	*2.8*
New Sports Fields and Active Urban Recreation		***149.9***
Sports Field Complex		
Multi-Use Lawn		65.9
Waterfront Recreation & Event Pier		22.1
	Subtotal	*6.7*
	Total	***94.7***
	Project Total	***244.6***

SOURCE: Lennar Urban 2009.

Research & Development

Other than the amount of neighborhood retail that would be developed, the land uses proposed in the R&D district are the same as the Project. The R&D district would include 62,000 gsf of neighborhood retail uses, 13,000 gsf less than what is proposed with the Project.

■ Parks and Open Space at HPS Phase II

The Housing Variant parks and open space on Candlestick Point would be the same as the Project; this discussion focuses on HPS Phase II changes. The Housing Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. HPS Phase II would have 244.6 acres (13 acres more than the Project) of parks and open space. The Sports Field Complex proposed with the Housing Variant would be 65.9 acres, which is 6.2 acres more than proposed with the Project. An additional 6.5 acres of parks not included in the Project would be constructed in the HPS South The 4.4-acre Hunters Point South Park would be constructed in the HPS South district, which is not included in the Project. Table IV-21 presents the proposed park and open space at HPS Phase II in the Housing Variant. Figure IV-9 (Housing Variant Parks and Open Space) illustrates the location of the proposed parks and open space.

SOURCE: Lennar Urban, RHAA, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT PARKS AND OPEN SPACE

FIGURE IV-9

Transportation and Circulation

A new Yosemite Slough bridge serving transit, bike, and pedestrian traffic only would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. The additional four auto lanes on the bridge to serve game-day traffic, proposed with the Project, are not included in this variant. The bridge would be approximately 40 feet wide and would cross the Slough at the same location as the Project. The bridge and its approach streets would have two dedicated transit lanes and a separate Class I bicycle and pedestrian lane, which would be open at all times.

The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

At HPS Phase II, additional roadways to serve the residential uses on HPS South would be included and residential parking would be increased to serve the additional residential units, compared to the Project.

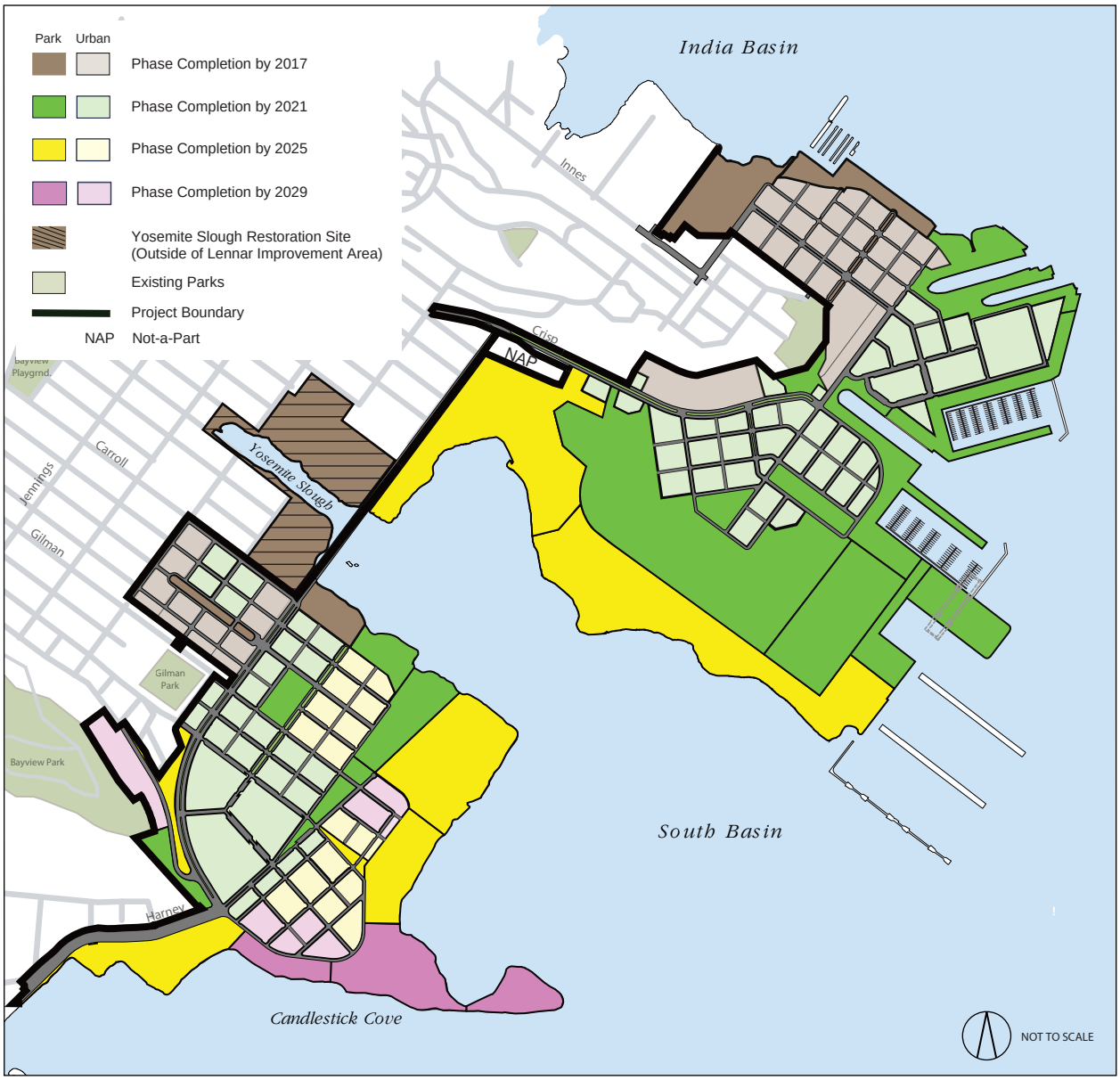
Infrastructure

The location of major infrastructure improvements would be very similar to that which is proposed for the Project but rather than terminating at the stadium site, the improvements would be sited under the roadways of HPS South. Stormwater treatment methods are designed for site-specific conditions and have been identified for the Housing Variant and are discussed below.[1230]

Implementation

- Residential development at HPS Phase II would begin in 2012 with completion in 2023. Figure IV-10 (Housing Variant Building and Parks Construction Schedule) illustrates the overall phasing for the Housing Variant.

[1230] Arup, *Candlestick Point/Hunters Point Shipyard LID Stormwater Opportunities Study*, August 2009.



SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-10

HOUSING VARIANT BUILDING AND PARKS CONSTRUCTION SCHEDULE

IV.C.4 Potential Environmental Effects

Overall, the Housing Variant would not increase the total amount of development as compared to the Project but rather would remove the 69,000-seat football stadium from the development plan and relocate 1,350 housing units from the Candlestick Point site to the HPS Phase II site. As such, in a general context, the Housing Variant includes all uses proposed with the Project with the exception of the stadium area, which would be replaced by the relocated housing units. With the exception of the fewer housing units at Candlestick Point, all characteristics of Candlestick Point would be the same as the Project. This analysis focuses on the changes that would occur at HPS Phase II. Thus, potential construction-related environmental effects of the Housing Variant would be substantially similar to the Project because the development programs are substantially similar, with the exception of the removal of the football stadium, and construction activities would, in general be the same. Potential operational effects of the Housing Variant would be substantially similar to the Project because the football stadium proposed with the Project was only proposed to be used for 12 games, and 20 other events, a year. Further, operational impacts would be primarily related to the day-to-day activities of residential dwelling units, not because there would be an increased number but rather because their location would be different.

Land Use and Plans

As shown in Figure IV-7, the Housing Variant would remove the stadium proposed with the Project and relocate 1,350 residential dwelling units from Candlestick Point to HPS Phase II. This would have the potential to increase land use impacts at the site as removal of the stadium from the land use program could conflict with existing applicable land use plans.

Division of an Established Community

The Project site generally includes underutilized and vacant parcels with limited access to the Bay shoreline and CPSRA. Connectivity between the Bayview Hunters Point neighborhood, Candlestick Point and HPS Phase II is limited. Large parking lots and vacant parcels at Candlestick Point separate the Bayview Hunters Point neighborhood from the Bay shoreline, and primary access roads do not include pedestrian, transit or bicycle features. Access to HPS Phase II is restricted to certain areas (those areas used for artist studios), and the area remains isolated from surrounding neighborhoods. The Housing Variant would maintain residential communities at Alice Griffith public housing and at Jamestown Avenue, similar to the Project.

- The Housing Variant (Variant 2) proposes infill development, centered on nodes of commercial and retail activity at Candlestick Point and HPS Phase II with no physical divisions. Residential and non-residential infill around these nodes of activity would provide a more continuous land use pattern and street grid, provide new services and community amenities in the Bayview Hunters Point neighborhood, allow better access to parks and recreational facilities (which would be improved under the Housing Variant), and remove existing barriers to circulation and access. There are five privately owned parcels on Candlestick Point that the Applicant seeks to acquire for the development, including one block on Jamestown Avenue in the Jamestown District (currently vacant) and four contiguous parcels in the Candlestick Point North District (either vacant or containing an RV park). If these private parcels are not acquired by the Applicant, they would be permitted under the BVHP Redevelopment Plan and the Planning Code to develop via an Owner Participation Agreement (OPA) in a manner that is consistent with the BVHP Redevelopment Plan

or would be allowed to operate as an existing non-conforming use. For those parcels that are currently developed, or for any of the parcels if they develop via an OPA, that development would be included in the overall total development that would occur on the Project site. The total amount of development under this variant would not change; that is, the Applicant's development on the remaining portion of the site plus any development under separate OPAs as envisioned under the Housing Variant would result in the same overall development level as proposed by the Applicant. The Housing Variant (Variant 2) would not divide an established community; therefore, no impact would occur, similar to the Project.

Consistency with Plans and Policies

Applicable plans that direct or regulate development on the Project site include the San Francisco General Plan, Candlestick Point State Recreation Area General Plan, San Francisco Bay Plan, San Francisco Bay Trail Plan, Bay Area Seaport Plan, Bayview Hunters Point Area Plan, Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, and San Francisco Planning Code. San Francisco's Sustainability Plan also applies to the Housing Variant. While the Housing Variant is generally consistent with goals and objectives of most plans, the Housing Variant would be inconsistent with land use designations that reflect former economic realities or former plans for the site. These inconsistencies would require amendments to the relevant plans, but do not reflect any impacts to the environment that the plans and policies seek to avoid. As described in connection with the Bay Plan and Seaport Plan, the designation of industrial uses along the waterfront is not a policy adopted to protect the environment, and the Housing Variant's proposals for this land represent an environmental improvement. Inconsistencies regarding the development pattern at HPS and the uses on Candlestick Point simply reflect the shifting locations of proposed uses within the site. The Housing Variant's proposed changes in the arrangement of land uses would not implicate any environmental protection objectives of the current land use designations in the redevelopment plans and other applicable land use plans; thus, the inconsistencies do not give rise to a significant impact on the environment, similar to the Project.

Change to the Land Use Character

The Housing Variant would alter the land use character at the Project site with new development of residential uses, R&D uses, regional and neighborhood retail uses, an arena, and public open space in the same proportions as the Project and without the stadium use. The Housing Variant's would extend the existing street grid and block pattern into HPS Phase II. The open space network would connect to the shoreline to the north and south.

This development would be considered to improve the existing land use conditions, and would not have an adverse effect on land use character of the Project site itself.

The Housing Variant would result in a substantially different built environment compared to the existing character of the site and vicinity. With the transition in scale and uses, the extension of the existing street grid, and with the connectivity of new open space with existing shoreline open space, the Housing Variant would be compatible with surrounding land uses. The Housing Variant would not result in a substantial adverse change in the existing land use character at the Project site or vicinity, and overall density would be less than the Project. The impact would be less than significant, similar to the Project.

Population, Housing, and Employment

In general, impacts from the Housing Variant would be similar to the Project because land uses and densities are substantially the same, with the exception of removal of the football stadium.

As shown in Figure IV-7, the Housing Variant would remove the football stadium from the development plan and relocate 1,350 housing units from the Candlestick Point site to the HPS Phase II site. However, the Housing Variant would not increase the number of residential units, nor other land uses. As such, the Housing Variant would have the potential to reduce the number of employment opportunities (both construction and operational) at the site over levels anticipated with the Project, as discussed below. However, the permanent residential population would not change.

Direct Impacts

- With the Housing Variant (Variant 2), the first phase of construction is scheduled for completion in 2019, extending through 2031, a period of approximately 12 years. This is similar to the construction schedule proposed at the HPS Phase II site for the Project, and, therefore, the number of construction personnel required at any given time at the HPS Phase II site would be similar to the total projected to be required for the Project. Construction employment opportunities are temporary in nature and would not result in a substantial increase in the number of employees in the area. Therefore, the Housing Variant would result in a less-than-significant impact to population during construction.

  Direct population growth with the Housing Variant would include residents and employees who would occupy new homes and the employment space(s), respectively. With the Housing Variant, the football stadium proposed with the Project would be removed from the development plan and 1,350 housing units would be relocated from Candlestick Point to HPS Phase II. There would be no change to the number of proposed housing units; therefore, the permanent resident population with the Housing Variant would be the same as with the Project. However, the Housing Variant would reduce the number of jobs compared to the Project due to the removal of the stadium and no additional employment opportunities would be created. The Housing Variant would result in approximately 10,378 jobs. Total employment with the Housing Variant would represent approximately 1.4 percent of the 748,100 jobs anticipated Citywide in 2030. Overall, development with the Housing Variant would be less intensive than the Project.

  Although the Housing Variant would result in a decrease in employment at the HPS Phase II site, growth in this area has long been the subject of many planning activities. The Housing Variant would provide all on-site infrastructure for connections to City mains, and would include on-site treatment of stormwater runoff. Therefore, the relocation of the housing units would not encourage growth where appropriate infrastructure would not be available.

  Employment growth at HPS Phase II would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. The Housing Variant would not alter the number of housing units proposed with the Project although it would relocate 1,350 housing units from Candlestick Point to HPS Phase II. Additionally, there would be a net decrease in jobs, which would mean that the Housing Variant would result in a less-than-significant impact than the Project. Total demand for housing with the Housing Variant would represent 3.7 percent of the total Bay Area housing need of

Table IV-22 Housing Variant Employment by Land Use

Land Use	*Employment Factor*[a]	*Development Program, Candlestick Point*[b]	*Employment, Candlestick Point (jobs)*	*Development Program, HPS Phase II*[b]	*Employment, HPS Phase II (jobs)*	*Total Employment (jobs)*
Residential	25 units/job	6,500 units	260	4,000 units	160	420
Regional Retail	350 gsf/job	635,000 gsf	1,814	0 gsf	—	1,814
Neighborhood Retail	270 gsf/job	125,000 gsf	463	125,000 gsf	463	926
Office	276 gsf/job	150,000 gsf	543	0 gsf	—	543
Research and Development	400 gsf/job	0 gsf	—	2,500,000 gsf	6,250	6,250
Hotel	700 gsf/job	150,000 gsf	214	0 gsf	—	214
Arena/Performance Venue	300 jobs/event[c]	150 events/year[c]	87	0 events	—	87
Public Parking	270 spaces/job[e]	3,706[e]	14	5,076[e]	19	33
Parks and Open Space	0.26 jobs/acre[f]	104.8[g]	27	244.6[g]	64	91
Total			***3,422***		***7,008***	***10,378***[h]
Project Total						***10,730***

SOURCES: Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project*, 2009.

a. Employment factors are from City and County of San Francisco, *Transportation Impact Analysis Guidelines*, October 2002.
b. Based on buildout floor areas provided in Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV-19 for HPS Phase II.
c. Lennar Urban, LLC estimates that there would be approximately 150 events at the arena annually and that employees would work 4-hour shifts.
d. Employment factors for public parking facilities provided by Economic and Planning Systems, Inc., 2009.
e. Parking based on Table IV-19 of this EIR, Chapter II. Includes Commercial (structured) and General and Commercial (on street). Residential parking at HPS Phase II would be increased compared to the Project to provide parking for the relocated Residential space.
f. Employment factors for parks and open space provided by Economic and Planning Systems, Inc., 2009.
g. Open space acreages based on Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV-21 for HPS Phase II.
h. While Project employment includes 359 stadium jobs, the Housing Variant also includes 1 net new job related to public parking, and six net new jobs related to parks; therefore, the difference between the Project and the Housing Variant is 359 - 1 - 6 = 352 net jobs.

214,500 units (based on the Regional Housing Needs Assessment (RHNA) targets; refer to Section III.C.3 projected by ABAG through 2014.[1231] Based on the total employment available with the Housing Variant (10,378 jobs), total housing demand would be 7,990 units.[1232] As discussed above, the Housing Variant would provide approximately 10,500 dwelling units. This would exceed the approximately 7,990 dwelling unit demand anticipated with the Housing Variant. Therefore, the population increase associated with employment with the Housing Variant could be entirely accommodated. However, it is likely that some employees with the Housing Variant would elect to live elsewhere in the City or within surrounding Bay Area communities.

Based on existing commuting patterns, the Housing Variant would generate a demand for about 3,596 units in surrounding Bay Area communities. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

It is not anticipated that the increase in employment with the Housing Variant would create a substantial demand for housing in the immediate neighborhood, in San Francisco, or in the region in excess of the housing provided as part of the Housing Variant or housing otherwise available in the Bay Area. Necessary improvements to infrastructure, public services, and housing associated with direct population growth proposed as part of the Housing Variant has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant, similar to the Project.

Indirect Impacts

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be potential for development with the Housing Variant to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the Housing Variant site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve both the Candlestick Point and HPS Phase II sites, without significant excess capacity that might encourage additional local growth beyond that already anticipated under Proposition G and with the redevelopment plans. Development with the Housing Variant would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant, similar to the Project.

The potential for impacts due to housing displacement would be substantially similar to the Project. The Housing Variant would not increase residential units proposed with the Project. However, any dwelling units removed with the Housing Variant would be replaced on site by the proposed development and no residents would be displaced, necessitating the construction of replacement housing elsewhere. There would be no impact, similar to the Project.

[1231] The RHNP is updated every five years and does not extend through 2030.

[1232] Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.

Transportation and Circulation

Overall, the Housing Variant would not increase the total amount of development compared to the Project but would relocate approximately 1,350 housing units from Candlestick Point to HPS Phase II. Therefore, 4,000 residential units (rather than 2,650 residential units) would be developed at HPS Phase II. The Housing Variant would include all uses proposed with the Project with the exception of the stadium, which would be replaced by the relocated housing units. There would be no football stadium. Therefore, the Housing Variant would not have game day or other stadium event transportation impacts associated with the Project. The Housing Variant would have the same roadway, transit, bikeway, and Bay Trail improvements proposed with the Project, including the Yosemite Slough bridge. However, the bridge would be narrower than the bridge with the Project, with a 39-foot-wide right-of-way to accommodate two 11-foot-wide BRT lanes, a sidewalk, and a Class I bicycle path.

The Housing Variant would include a Transportation System Management plan and would develop and implement a Transportation Demand Management plan, as with the Project.

The Transportation Study analyzed the Housing Variant and conclusions from the Transportation Study have been presented below.

Construction Impacts

Construction activities associated with the Housing Variant would be similar to the Project. Depending on the phasing of the additional development, the Housing Variant may result in fewer construction traffic impacts between future years 2012 and 2017 when the new stadium would be constructed, and somewhat greater impacts in the years the housing would be constructed. Implementation of a Construction Traffic Management Program (the same as described for the Project) would help minimize the Housing Variant's contribution to cumulative construction-related traffic impacts. However, localized construction-related traffic impacts would therefore remain significant and unavoidable.

The Housing Variant would have 218,989 total daily person trips, fewer than the trips generated with the Project (219,651). Similarly, the Housing Variant would generate fewer peak hour person trips during both the AM and PM peak hours (13,489 weekday AM trips, 20,359 weekday PM trips, and 18,121 Sunday PM trips).

Intersection LOS

The Housing Variant would have similar project and cumulative effects at most study intersections as would occur with the Project; only cumulative impacts at the intersections of Cesar Chavez/Evans and Bayshore/Oakdale would worsen as compared to the Project. Section III.D discusses traffic effects at those intersections and the feasibility of mitigation measures. As noted in Impact TR-3, Impact TR-4, Impact TR-5, Impact TR-6, and Impact TR-8, Project intersection impacts would be significant and unavoidable. Those conclusions would apply as well to the Housing Variant. Like the R&D Variant, the Housing Variant would contribute to cumulative traffic in the 2030 condition at Cesar Chavez/Evans and cause intersection operating conditions at Bayshore/Oakdale to worsen in the PM peak hour from LOS C under 2030 conditions to LOS E. No feasible mitigation exists for either intersection and the Housing Variant's contribution to cumulative impacts would be significant and unavoidable.

Traffic spillover effects with the Housing Variant would be significant and unavoidable, as with the Project.

Freeway Conditions

The Housing Variant effects on freeway mainline sections would be similar to the Project, although the magnitude of impacts may be greater with the Housing Variant due to increased traffic generation compared to the Project. Therefore, the Housing Variant-related and cumulative effects freeway operating conditions on this segment would be considered significant and unavoidable.

The Housing Variant effects on freeway ramp junctions would be similar to the Project, although the magnitude of impacts may be greater with the Housing Variant due to increased traffic generation compared to the Project. As described for Project impacts, no feasible mitigation measures have been identified for future freeway ramp junction conditions. Therefore, the Housing Variant contribution to freeway ramp operating conditions would be considered significant and unavoidable.

The Housing Variant ramp queuing effects would be similar to Project effects. The Housing Variant would result in significant impacts with respect to ramp queuing at the same off-ramp locations as the Project, with one exception. With the Housing Variant, the US-101 northbound off-ramp to Harney Way would not be likely to experience queues extending back to the mainline in the PM peak hour. However, the Housing Variant's contribution to other off-ramps expected to experience significant traffic impacts associated with queuing under Project conditions would be the same as the Project. As described for Project impacts, no feasible mitigation measures have been identified for the freeway off-ramps expected to experience significant impacts. Therefore, the Housing Variant's contribution to freeway segments operating at LOS E or LOS F conditions would be considered significant and unavoidable.

Transit Impacts

The Housing Variant, as with the Project, would include extended and new transit services; transit trips with the Housing Variant would be accommodated within the capacity of these services. The Housing Variant, as with the Project, would have a less than significant impact with mitigation on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with the Housing Variant would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. Project mitigation measures MM TR-21 to MM TR-30 would also apply to the Housing Variant, but as concluded in Section III.D, the feasibility or implementation of the measures is uncertain, and the transit delay effects would remain significant and unavoidable.

The Housing Variant would require a similar number of additional vehicles on the same routes as the Project to mitigate transit congestion delays.

Bicycle Impacts

The Housing Variant bicycle trips would be accommodated within the proposed street and network, and impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The Housing Variant would be accommodated within the proposed sidewalk and pedestrian network, and impacts on pedestrian circulation would be less than significant.

Parking Impacts

The Housing Variant would result in a demand for about 21,310 spaces, compared with a maximum permitted supply of about 16,624 spaces; therefore, the maximum off-street parking supply would be about 4,686 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. Due to parking supply constraints and accessibility to transit, future Housing Variant parking demand may be somewhat lower than estimated, and therefore the parking space shortfall would also be less than represent the number of spaces that would be required in order to accommodate all the vehicles anticipated if the proposed parking supply was unconstrained. Since the parking supply would be constrained, the actual parking demand would be expected to be less. As discussed in Section III.D, peak parking demand would not represent do not occur simultaneously; public parking facilities, such as the one proposed in Candlestick Point, and on-street parking spaces can usually be shared efficiently among many destinations; and the Housing Variant would include a Travel Demand Management program that includes a number of parking strategies to make auto use and ownership less attractive, as well as strategies to encourage alternative modes.

As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Housing Variant impacts on parking would be less than significant.

- The Housing Variant would have the same arena-related transportation effects as with the Project, that is, significant and unavoidable impacts on traffic and transit operations, except that, like the R&D Variant, the impact to transit operations would be caused by traffic congestion (as for the Project) and by possibly added transit demand. As for the R&D Variant, this possible effect would be reduced by having SFMTA increase the frequency on regularly scheduled Muni routes (primarily the CPX-Candlestick Express) serving the arena area prior to large events at the arena and having the arena operator provide additional shuttle service to key regional transit destinations, such as BART, Caltrain, and the T-Third light-rail route. Implementation of this mitigation and MM TR-23.1 would reduce but not avoid significant impacts on transit operations. Also as for the Project and the R&D Variant, implementation of mitigation measure MM TR-41 (Transportation Management Plan for the arena) would reduce but not avoid significant impacts on traffic.

  The Housing Variant would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

In general, impacts from the Housing Variant would be similar to the Project because land uses and densities are substantially the same, with the exception of elimination of the proposed football stadium.

The Housing Variant would not increase the number of residential units or other land uses. Construction impacts would be substantially similar to the Project because the overall proposed uses and necessary activities would be the same as with the Project. Operational impacts would be similar but less than those identified with the Project, as the proposed residential buildings would be lower in height than the proposed stadium. All other urban design and building forms with the Housing Variant, and resulting effects, would be similar to conditions with the Project. Furthermore, the density of the residential areas across both the Candlestick Point and HPS Phase II sites would be lowered.

Construction

- As noted above, construction impacts of the Housing Variant (Variant 2) on the visual character of the area would be similar to the Project because construction practices and activities would be similar for similar types of construction. Construction of the housing on the proposed stadium site would occur later in the 20-year building period than construction of the stadium under the Project. Construction activities would occur throughout the 702-acre Housing Variant site over the build-out period, ending in 2031. Visual impacts associated with construction activities would include exposed pads and staging areas for grading, excavation, and construction equipment. In addition, temporary structures could be located on the site during various stages of demolition or construction, within materials storage areas, or associated with construction debris piles on and off site. Exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible for the proposed utilities and infrastructure improvements, as well as for roadway improvements. Although these activities would take place primarily within the Housing Variant site, they would be visible to surrounding land uses. However, these visual conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Further, temporary conditions (e.g., bulldozers, trenching equipment, generators, trucks, etc.) associated with construction would not result in obstruction of a scenic vista, as construction equipment is not tall enough to interfere with views of the Bay, the East Bay hills, or the San Francisco downtown skyline. The Housing Variant site is not located within a state scenic highway. The only scenic resources on or near the site are the CPSRA, the Re-gunning crane, Yosemite Slough, the shoreline, the Bay, San Bruno Mountain, and Bayview Hill. There are no rock outcroppings or major areas of landscaping on the site, although some ruderal vegetation would be removed. Construction of the Housing Variant would not affect the Re-gunning crane, which would remain intact after implementation of the Housing Variant. Therefore, construction activities would have a less-than-significant impact on scenic vistas and scenic resources, similar to the Project. Mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts during Construction) would further reduce potential impacts to the visual character of the area.

Construction impacts of the Housing Variant to light and glare would be similar to the Project because proposed uses and materials would be the same. Construction would occur during daylight hours, generally between 7:00 A.M. and 8:00 P.M. or as otherwise allowed by the City. A minimal amount of glare could result from reflection of sunlight off windows of trucks, but this would be negligible and would not affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this

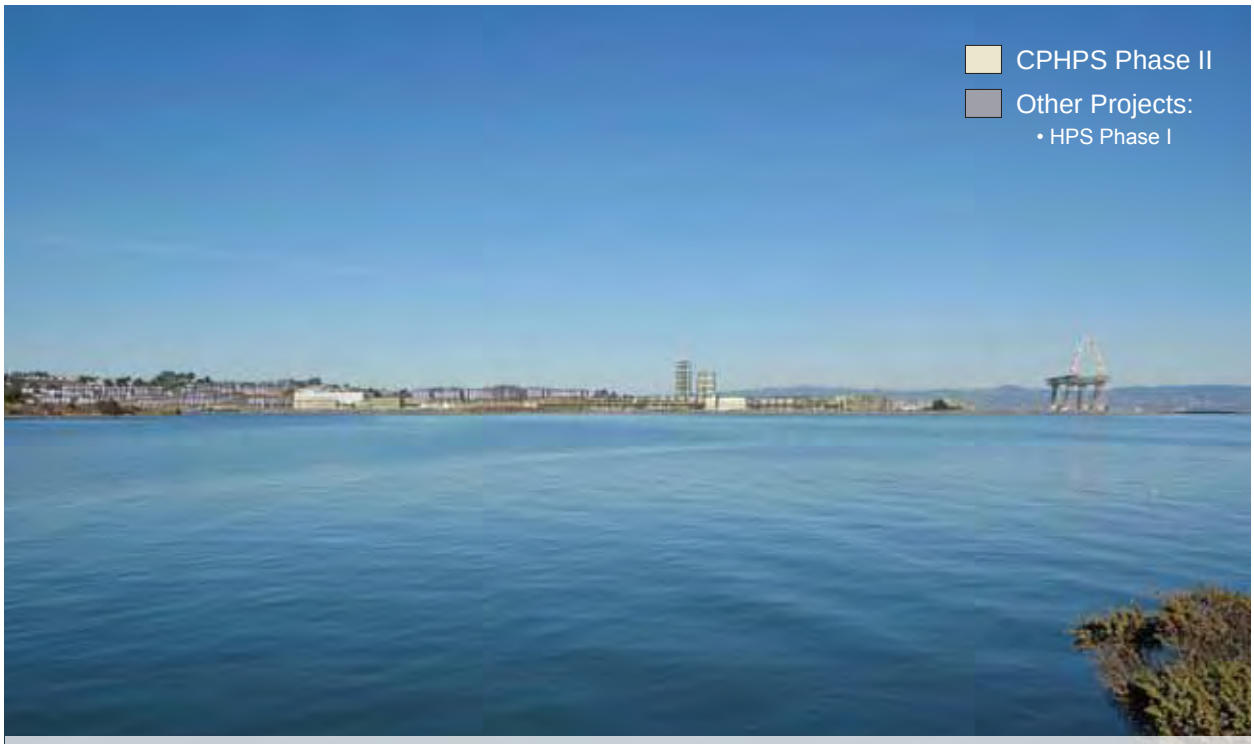
lighting would be minimal, restricted to the Housing Variant site, and would not exceed the level of existing night lighting levels in urban areas. In addition, construction lighting would comply with any City of San Francisco lighting requirements. Therefore, construction activities would have a less-than-significant impact due to light and glare, similar to the Project.

Operation

Operational impacts to views would be substantially similar to, if not less than, the Project because the residential buildings would have heights lower than the average height of the football stadium and would have the benefit of architectural treatment (Figure IV-11 [Housing Variant Northeast from CPSRA]). With the Housing Variant, the stadium proposed with the Project would be removed from the development plan and 1,350 dwelling units would be relocated from the Candlestick Point site to the HPS Phase II site. On the HPS Phase II site, the proposed 69,000-seat 49ers stadium was to be 156 feet tall (about 15 stories) above the adjacent playing field. Residential buildings proposed with the Housing Variant at HPS South would vary in height from 40 to 65 feet, depending on location with buildings immediately adjacent to the proposed recreational facilities (primarily the multi-use field) being 40 feet tall. Even at the maximum 65 feet tall, the residential building would be a minimum of approximately 90 feet below the heights proposed with the Project. Although the Project would not substantially obstruct any views into the area, views would be less obstructed than with the Project. The area surrounding the additional new residential uses would be developed with new open space to the west, south, and east, and by new R&D uses to the north. With respect to adjacent neighborhoods, the HPS Phase II North district would be south of the India Basin neighborhood (Figure IV-12 [Housing Variant South from Hilltop Open Space]). Therefore, development with the Housing Variant would result in a less-than-significant impact due to obstruction of a view or scenic vista, similar to the Project. Even though relocation of 1,350 dwelling units out of Candlestick Point would take place with the Housing Variant, the majority of buildings in Candlestick Point would remain 65 feet. However, the number and location of towers would be reduced. For example, in the CP North area, the Housing Variant includes two 220-foot towers as opposed to five towers ranging from 170 feet to 270 feet. Similarly, in CP South, the Housing Variant proposes six towers (four, 270-foot towers; one 320-foot tower; and one 370-foot tower) compared to the six with the Project (two residential towers up to 370 feet, one tower up to 420 feet, one tower up to 270 feet, and two with maximum heights up to 320 feet). Building heights within the blocks along the eastern side of CP North would be reduced from a maximum of 140 feet to 85 feet. Additionally, as in HPS Phase II, these buildings constructed with the Housing Variant would have the benefit of architectural treatment. As such, views into the area would be less obstructed than with the Project and the Housing Variant would result in a less-than-significant impact due to obstruction of a view or scenic resource.

Development of the Housing Variant would have substantially similar impacts to the Project regarding the potential for damaging scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting because design of the proposed residential buildings would be of appropriate height, massing, and architectural treatment. With the Housing Variant, the football stadium proposed with the Project would be removed from the development plan and 1,350 dwelling units would be relocated from Candlestick Point to HPS Phase II. At the HPS Phase II site, the Housing Variant would continue to remove old, deteriorating structures associated with ship repair, piers, dry-docks, storage, and administrative uses and replace these structures

Existing



Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-11

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT NORTHEAST FROM CPSRA

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-12

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT SOUTH FROM HILLTOP OPEN SPACE

with new development. Currently, the HPS Phase II site contains limited landscaping and is primarily a degraded industrial setting. Bayview Hill, located on the Candlestick Point site, is a prominent scenic resource for HPS Phase II and would remain intact with the Housing Variant development with the exception of close-in vantage points, which may be altered. However, with the Housing Variant, proposed heights in the area of the former stadium would range from 40 to 65 feet, substantially lower than the proposed 156-foot maximum height of the football stadium. Furthermore, the Housing Variant would retain structures at the potential HPS Drydock Historic District, as well as the Re-gunning crane, a highly visible landmark. Development of the HPS Phase II site with the Housing Variant would also include about 349 acres of new and renovated parkland, open space, and sports fields, with improved public access, thereby improving the scenic quality of the area (13 acres more than the Project would provide). The Housing Variant site is not located within a state scenic highway. Therefore, development at the HPS Phase II site would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting, and the impact would be less than significant. Additionally, the Housing Variant would not substantially degrade the visual quality or character of the Housing Variant site or its surroundings and the impact would be less than significant, similar to the Project.

The Housing Variant would not include the field lighting and other night-time lighting associated with the 49ers stadium. The Housing Variant would have way-finding, security, and street lighting associated with similar residential uses and the adjacent R&D uses to the north of the HPS South area as well as other development at HPS Phase II. The Housing Variant would not interfere with any existing views of the night sky from across the Bay, nor would glare affect those viewers, similar to the Project. New sources of light associated residential uses during the evening could result from the Housing Variant, which would provide lesser impacts than the football stadium proposed with the Project. Impacts of the Housing Variant would be substantially similar to or less than the Project and would result in a less-than-significant impact. Incorporation of mitigation measures MM AE-7a.1 (parking lot lighting), MM AE-7a.2 (landscape and sign illumination), MM AE-7a.3 (lighting plan), and MM AE-7a.4 (non-reflective materials) would further reduce potential impacts.

Shadows

As shown in Figure IV-7, the Housing Variant would replace the 156-foot-high football stadium proposed under the Project with 1,350 housing units relocated from Candlestick Point in 40- and 65-foot-high structures. As the proposed new residential buildings at HPS Phase II would be lower in height than the stadium, and as the height of residential towers at Candlestick Point would be reduced, shade impacts would be less than the project.

Construction

As with the Project, construction activities of the Housing Variant would not result in shadow effects on open space.

Operation

As shown in Figure IV-8, the Housing Variant would replace the 49ers stadium (up to 156 feet high) with housing buildings of 40 and 65 feet high in the Hunters Point Shipyard South district. As a result of the relocation of housing units from Candlestick Point to the Hunters Point Shipyard South district, several of the residential towers at Candlestick Point would be reduced in height.

All other land use and building heights in the Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same as with the Project. HPS Phase II would include new open space at Grasslands Ecology Park, Sports Fields, and Multi-Use Lawn at Hunters Point Shipyard South, the Waterfront Recreation Pier, the Waterfront Promenade, Heritage Park, and Northside Park. However, the Housing Variant would have a different configuration of open space at Hunters Point Shipyard South than the Project. Refer to Figure IV-7.

For this variant, development at Candlestick Point would result in new structures with the potential to cast shadows on existing or proposed parks and open space. However, these shadows would not substantially affect outdoor recreation facilities or other public areas and impacts would be less than significant. As the height of some residential towers at Candlestick Point would be reduced compared to the Project, shade impacts at Candlestick Point would be less than the Project.

As the building heights and land uses at Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same for the Housing Variant as the Project, development at those locations would not add shade year round to existing public open space, including India Basin Shoreline Park and India Basin Open Space.

During morning and mid-day periods from September through March, the Housing Variant would have similar shading effects as the Project, on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Parks and Open Space. In mid-afternoon, the Housing Variant would shade the Waterfront Promenade. During summer months, the Housing Variant would result in shade on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Open Space.

All other shadow effects at HPS Phase II, including Northside Park, would be the same as with the Project. Shadow effects would be the same at Candlestick Point.

Although the Housing Variant would cast shadows on recreational and open space, it would not substantially affect outdoor recreation facilities or other public areas or have an adverse effect on the use of the open space and impacts would be less than significant. As the height of structures would be reduced in the Hunters Point Shipyard South district, shade impacts would be slightly less than Project.

Wind

As shown in Figure IV-8, the Housing Variant would replace the 156-foot-tall football stadium with 40- and 65-foot-tall residential units in HPS South. Additionally, the number and height of towers in Candlestick Point would be reduced thereby reducing the potential for wind impacts.

Construction

Construction activities of the Housing Variant would not result in additional wind impacts, similar to the Project. Impacts such as fugitive dust emissions and erosion from wind are addressed in Section III.H and Section III.M.

Operation

Building structures near or greater than 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 mph equivalent wind speed for a single hour of the year would be exceeded. There is no threshold height that triggers the need for wind-tunnel testing to determine whether the building design would result in street-level winds that exceed the standard. It is generally understood, however, from wind-tunnel testing on a variety of projects in San Francisco, that most, if not all, buildings under 100 feet do not result in adverse wind effects at street level barring unusual circumstances.

For the Housing Variant, the height of some residential towers at Candlestick Point would be reduced, however most are likely to exceed 100 feet in height. Thus development at Candlestick Point would result in new structures with the potential generate winds that could affect ground-level pedestrian spaces. Implementation of mitigation measure MM W-1a (Building Design Wind Analysis), which would require a design review process for buildings greater than 100 feet in height, and if determined to be necessary, inclusion of a design criteria to reduce pedestrian-level impacts, would reduce impacts to a less than significant level. As the height of towers would be reduced, impacts would be less than the project.

As shown in Figure IV-8, residential buildings in the Housing Variant would replace the 156-foot-high stadium with residential buildings ranging from 40 to 65 feet. As such, the residential uses at HPS Phase II would not exceed 100 feet in height and would not result in adverse wind effects. As the Housing Variant would not include any structures exceeding 100 feet in height at HPS Phase II, impacts would be less than the Project.

Air Quality

As shown in Figure IV-7, the Housing Variant removes the stadium proposed under the Project and relocated 1,350 residential dwelling units from Candlestick Point to HPS Phase II. Other than the stadium site, land uses provided with a Housing Variant would be the same as the Project. As land uses would remain the same, the potential air quality impacts would be the virtually same as the Project; however, as the construction housing in place of the stadium would require fewer equipment, impacts from emissions associated with construction activities would be reduced. Operational impacts would be similar but greater than those identified under the Project as the proposed additional residential development would result in greater daily criteria pollutant emissions than the stadium.

Construction

- As stated above, overall construction impacts of the Housing Variant (Variant 2) with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre Housing Variant site over the approximately 20-year build-out period ending in 2031, with the construction of the additional dwelling units occurring between 2019 and 2023. Similar to the Project, construction activities under the Housing Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures,

use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

With respect to construction emissions, construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[1233] Any project within the City of San Francisco, including the Housing Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, impacts would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the Housing Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1234] that evaluated potential human health risks associated with construction and operation of the Project quantitatively and the proposed variants qualitatively, including the Housing Variant. As construction emissions associated with the Housing Variant are expected to be lower than those associated with construction of a stadium in the same location (e.g., Project), the Housing Variant would have lower impacts than the Project.

The HRA evaluated potential impacts to numerous receptors (off-site residents, off-site workers, off-site students, and on-site residents) in and around the Project. BAAQMD CEQA Guidelines have an established threshold of 10 in one million for carcinogenic health risks; the HRA concluded that the inhalation cancer risk at the MEI would be 4.5 in one million. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the threshold. The Housing Variant is not anticipated to exceed Project impacts and therefore would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.01, which is below the BAAQMD's significance threshold of 1.0.

[1233] BAAQMD. 1999. *BAAQMD CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*. December.
[1234] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. October. Appendices I & II. (Appendix S to this EIR)

As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the Housing Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Construction activities at both Candlestick Point and HPS Phase II have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity.

As noted above, BAAQMD has an established threshold of 10 in 1 million for carcinogenic health risks; the inhalation cancer risk at the point of maximum impact or MEI as a result of construction activities at the Project would be 0.04 in one million. This represents the maximum level of PM_{10} experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM_{10} from construction activities associated with Candlestick Point would not exceed the threshold. The Housing Variant is not anticipated to exceed Project impacts and therefore would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum non-cancer HI to be 0.03, which would be below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of HPS Phase II have been determined to be below established thresholds, this impact is less than significant with MM HZ-15, similar to the Project.

Operation

Operational impacts to regional and local air quality would be substantially similar to the Project. Development at Candlestick Point would remain the same as under the Project and impacts would be the same as identified under the Project. Under the Housing Variant, the football stadium proposed under the Project would be replaced with 1,350 residential units redistributed from Candlestick Point to HPS Phase II. Due to the redistribution of uses under this variant, approximately 908 additional vehicle trips over that of the Project would occur and thereby result in a higher level of daily VMT than the Project. As such, the level of emissions anticipated under the Housing Variant would be greater than the Project, as shown in Table IV-23 (Housing Variant Operational Criteria Pollutant Emissions [Year 2030]). The difference in daily criteria pollutants would increase under this variant compared to the Project by 1 to 2 percent, depending on the criteria pollutant evaluated.

However, both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Housing Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. The Housing Variant's transportation analysis estimates that a similar Housing development that did not include the trip reduction features of the Housing Variant would generate 136,868 daily external motor vehicle trips (about 73 percent more than the Housing Variant's daily external motor vehicle trips). The comparison of the Housing Variant to a similar level of development under "business as usual" conditions is also shown in Table IV-23.

Table IV-23 Housing Variant Operational Criteria Pollutant Emissions (Year 2030)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Hunters Point Shipyard					
Area[a]	242	49	38	2	2
Motor Vehicles (External)	98	88	1,002	462	87
Subtotal	*340*	*136*	*1,040*	*464*	*89*
Candlestick Point					
Area[a]	373	60	45	3	3
Motor Vehicles (External)	210	191	2,174	1,004	189
Subtotal	*583*	*250*	*2,219*	*1,007*	*192*
All Development Sites					
Area[a]	616	108	83	5	5
Motor Vehicles (External)	308	278	3,177	1,466	276
Motor Vehicles (Internal)	30	13	229	45	9
All Sources (Variant 1)	***953***	***400***	***3,489***	***1,516***	***290***
Comparison to Proposed Project	***101%***	***102%***	***102%***	***102%***	***102%***
Change from Proposed Project	*1%*	*2%*	*2%*	*2%*	*2%*
Comparison to Business as Usual	***87%***	***68%***	***65%***	***59%***	***60%***
Reduction from Business as Usual	*-13%*	*-32%*	*-35%*	*-41%*	*-40%*
All Development Sites (Business as Usual)					
Area[a]	616	108	83	5	5
Motor Vehicles	485	476	5,292	2,561	481
All Sources (Business as Usual)	***1,101***	***585***	***5,375***	***2,566***	***486***
Comparison to Variant 1	***115%***	***146%***	***154%***	***169%***	***168%***

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_X were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ associated with land uses anticipated under the Housing Variant would exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to would reduce the Housing Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact. It should be noted that, as stated above, although the significance under this variant would be similar to the Project, criteria pollutant emissions associated with the operation of uses under the Housing Variant would be greater than the Project, as stated in Table IV-23.

With respect to airborne human health risks, emissions associated with operation activities under the Housing Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle

emissions ($PM_{2.5}$). Under the Housing Variant, dwelling units would be relocated from CP to the HPS Phase II area.

This Housing Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the east of the proposed additional housing and south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1235]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. As the Housing Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.7. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0.

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the Housing Variant.

- In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways would shift location with development of the Housing Variant (Variant 2), as some residential units will be relocated from Candlestick Point to HPS Phase II. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations from traffic associated with the Housing Variant (Variant 2) were estimated at selected roadways and compared against the 0.2 μg/m3 action level to determine the potential health risks on receptors attributed to vehicle emissions from the Housing Variant (Variant 2). Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:
  - Third Street
  - Innes Avenue/Hunters Point Boulevard/Evans Avenue
  - Palou Avenue
  - Gilman Avenue/Paul Avenue
  - Harney Way

[1235] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

- Jamestown Avenue
- Ingerson Avenue

- With the addition of Variant-related traffic, no receptors along the streets listed above would experience an increase in $PM_{2.5}$ concentrations in excess of 0.2 $\mu g/m^3$ action level.[1236] Concentrations would not exceed the action level, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As shown in Figure IV-7, the Housing Variant remove the stadium proposed under the Project and relocated 1,350 residential dwelling units from Candlestick Point to HPS Phase II. Other than the stadium site, land uses provided with a Housing Variant would be the same as the Project. As land uses would remain the same, the potential noise impacts would be the same as the Project with the exception that the noise impact from operation of the stadium would not occur under the Housing Variant.

Construction activities for a Housing Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Housing Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Housing Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Housing Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Housing Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with the Housing Variant are shown in Table IV-24

[1236] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, May 4, 2010.

(Housing Variant Modeled Traffic Noise Levels along Major Project Site Access Roads). Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. However, the Housing Variant would have slightly lower noise levels than the Project along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, but would still be significant, as shown in the table. Measures available to address significant traffic noise increases in these residential areas are limited. As the ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Because the Housing Variant would not include a football stadium, noise impacts identified for the Project from football games and concerts would not occur with implementation of the Housing Variant.

The Housing Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Housing Variant does not include an aviation component. Therefore, a Housing Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Table IV-24 Housing Variant Modeled Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*2030 With Housing Variant*	*Variant-Related Increase*	*Allowable Increase*	*Significant Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	60.9	0	2	No
3rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	68.3	1.0	1	No
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	63.5	0	2	No
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	62.1	0.5	2	No
Ingalls Street north of Carroll Avenue	Residential	56.7	61.7	63.1	63.1	1.4	2	No
Carroll Avenue east of 3rd Street	Residential	**52.6**	**53.8**	**58.1**	**57.9**	**4.1**	**3**	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**64.5**	**3.9**	**2**	**Yes**
Jamestown Avenue north of Harney Way	Residential	**51.4**	**55.5**	**61.2**	**61.0**	**5.5**	**5**	**Yes**
Harney Way west of Jamestown Avenue	Residential	52.6	59	59.6	59.6	0.6	3	No
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	68.7	0.2	1	No

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_x were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

Cultural Resources and Paleontological Resources

As shown in Figure IV-7, the Housing Variant would remove the football stadium from the land use program of the Project and 1,350 dwelling units would be relocated from Candlestick Point to HPS Phase II. Both construction and operational impacts would be substantially similar to the Project because construction activities as well as the area and type of land disturbance would be similar. Additionally, the types of land use and associated activities are similar and were all analyzed in the initial land program.

Potential impacts to paleontological resources with the Housing Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Although no fossils have been reported at the Candlestick Point or HPS Phase II sites, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. Additionally, the presence of Bay mud under the fill around Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. However, mitigation measure MM CP-3a (paleontological resources) would reduce the effects of construction-related activities to paleontological resources to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*. Therefore, the Housing Variant would result in a less-than-significant impact to paleontological resources during construction activities, similar to the Project.

Potential impacts to archaeological resources with the Housing Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Records indicate that prehistoric archaeological sites are located within the HPS Phase II site, including CA-SFR-9, CA-SFR-11, CA-SFR-12, CA-SFR-13, and CA-SFR-14. Previous archaeological investigations have shown that prehistoric archaeological sites in the HPS Phase II site tend to be located along the original shoreline. Hunters Point had numerous maritime-related industries, including dry docks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site and construction activities may encounter previously unknown archaeological resources. Mitigation measure MM CP-2a (archaeological resources) would reduce the effects of construction-related activities to the archaeological resources in the HPS Phase II site to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. Therefore, the Housing Variant would result in a less-than-significant impact to archaeological resources during construction activities, similar to the Project.

At Candlestick Point, potential archaeological resources expected to be found could have important research value and would, therefore, be legally significant under CEQA. Examples of research themes that have been proposed to which expected archaeological resources could contribute significant data include: the spatial organization and historical development of Chinese fishing camps; effects, adaptations; and resistance of the fishing camps to anti-Chinese fishing legislation (1885–1930s); spatial organization of shipyards, development of local traditions of boat building technology, including that of the scow schooner and Chinese junks; the development; changing function; and inter-settlement relationships of prehistoric

shell mounds; comparative spatial organization of shell mound sites; changes in prehistoric faunal and biotic exploitation practices; prehistoric changes in social stratification; relationship between Hunters Point-Bayview and South of Market area prehistoric settlements. Any potential archeological resources, e.g., fishing camps, that are covered by existing development would remain covered and unavailable unless the site is redeveloped. While the development footprint at Candlestick Point is not proposed to change from what was analyzed for the Project, in the event that archaeological resources are discovered at Candlestick Point, MM CP-2 (archaeological resources, Candlestick Point) would reduce potential impacts to a less-than-significant level.

Historical resources at HPS Phase II include the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, with buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility."[1237] Contributing resources in the Hunters Point Historic District include Drydock 2, Drydock 3, and Buildings 140, 204, 205, 207, 208, 211, 224, 231, and 253.

- As with the Project, development at HPS Phase II with the Housing Variant (Variant 2) would result in the demolition of Buildings 211, 224, 231, and 253, which have been determined eligible as contributors to the California Register of Historic Resources (CRHR)–eligible Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. While the land use changes with the Housing Variant would not affect the HPS Phase II area within that potential historic district, implementation of the Housing Variant as a whole would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce but not avoid the significant adverse impact. As with the Project, the impact on historical resources with the Housing Variant would remain significant and unavoidable.

Operational activities anticipated with the Housing Variant would not differ substantially from the Project because neither would include ground-disturbing activities that would accelerate the potential deterioration of cultural resources. While 1,350 residential dwelling units at Candlestick Point would be relocated to HPS Phase II and the density of residential uses at Candlestick Point overall would be reduce, no comprehensive changes to the land use program within Candlestick Point would be made. These activities would not have the potential to adversely disturb paleontological, archaeological, or historical resources. Therefore, the Housing Variant would result in no impact to these resources, similar to the Project.

Hazards and Hazardous Materials

The building footprint of the Housing Variant would be less than the Project, as the same number of dwelling units would be constructed and the stadium would be eliminated. Construction activities associated with the Housing Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned

[1237] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.

school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the Housing Variant would be slightly less than for the Project, and, similar to the Project, would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the Housing Variant would require improvements to existing utility infrastructure and installation of new underground utilities, which could expose construction workers, the public, or the environment to hazardous materials. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The Housing Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the Housing Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the Housing Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable

requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the Housing Variant would be reduced to less-than-significant levels.

The Housing Variant would place housing on the HPS Phase II site. The Navy's cleanup plan is designed to remediate the HPS site to levels acceptable for the planned uses in the existing HPS Redevelopment Plan. To the extent that the Housing Variant proposes to place housing in areas not designated for residential use in the existing HPS Redevelopment Plan, additional hazardous materials remedial work could be required, which could result in some increased risk to workers, the public and environment from exposure to hazardous materials during the construction process. Any property that has not been remediated for unrestricted use at the time of transfer will have use restrictions placed on the property in compliance with the federal clean-up process. For use restrictions to be removed, the Project Applicant would be required by the transfer documents to obtain approval from the regulatory agencies overseeing the clean-up process before residential uses could be placed on these portions of the site. Any remedial activities undertaken as part of the construction process would be subject to the requirements in MM HZ-1b, which requires construction activities at HPS Phase II to be done in accordance with all restrictions imposed on the site by the federal regulatory clean-up process and these impacts would be less than significant, the same as for the Project.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the Housing Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed, above, the Housing Variant includes somewhat less excavation and construction than that anticipated under the Project. Similar to the Project, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the Housing Variant. Consistent with the discussion above, the Housing Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the Housing Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. Implementation of mitigation measures MM HZ-1a and HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2 would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirements of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all

requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II. Mitigation measure MM HZ-9 further requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

The Housing Variant would replace the proposed stadium at HPS Phase II with housing. This would result in a similar amount of hazardous materials being used compared to a stadium use. The Housing Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. Maintenance products used under the Housing Variant would be incrementally small, and would not increase the risk from handling these materials. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The Housing Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials in accordance with applicable federal and State laws and impacts would be less than significant.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. Compliance with federal, State, and local regulations would ensure that the impact would be less than significant, the same as for the Project.

Daily operations under the Housing Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but it would not pose a human health risk and/or result in an adverse effect on the environment. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The Housing Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the Housing Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The Housing Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the Housing Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

As shown in Figure IV-7, the Housing Variant would remove the football stadium from the development plan and relocate 1,350 dwelling units from Candlestick Point to HPS Phase II. Both construction and operational impacts to geology and soils would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those with the Project, with the exception of the football stadium due to its removal.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with the Housing Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the Housing Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the Housing Variant would be substantially similar to those of the Project.

The potential for exposure to adverse effects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground

accelerations for design of Housing Variant structures and the Yosemite Slough bridge, as required by the SFBC. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for Housing Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the Housing Variant, the potential for adverse effects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the Housing Variant, 1,350 dwelling units would replace the football stadium that is programmed for development with the Project. This specific area is not located adjacent to the shoreline such that the Housing Variant could result in impacts greater than those discussed with the Project. Therefore, the Housing Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse effects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Housing Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Housing Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse effects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level, similar to the Project.

With the Housing Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Housing Variant structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the Housing Variant.[1238] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the Housing Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The Housing Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

The footprint of development for the Housing Variant would be the same as for the Project, although the construction of the residential space would slightly decrease the extent of excavation for the foundation of buildings. As such, impacts from construction of the Housing Variant would be similar to the Project. With additional residential buildings replacing the stadium and associated parking lots, the total amount of development would be similar, as would the extent of impervious surfaces. Thus, operational impacts to hydrology and water quality would generally be similar to the Project.

Construction

With adherence to applicable regulatory requirements, construction activities associated with a Housing Variant would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With less excavation for building foundations, impacts would be less than and similar to the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project. Groundwater would not be used for any construction activities such as dust control or irrigation of vegetated erosion control features; no groundwater wells would be developed as part of the Project or and no on-site groundwater wells would be used for water supplies. Short-term construction groundwater dewatering may be necessary at certain locations (e.g., for installation of building foundations or underground utilities), but dewatering would have only a minor temporary effect on the groundwater surface table elevation in the immediate vicinity, and would not measurably affect groundwater supplies. The extent of impervious surfaces under the Housing Variant would be less than the Project, the Housing

[1238] GTC, 2005.

Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the Housing Variant site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of the Housing Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the Housing Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on-site or off-site. Impacts would be less than significant, similar to the Project.

Construction activities associated the Housing Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the Housing Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the Housing Variant would be less than the Project, impacts would be similar and slightly less than the Project. Development of the Housing Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of the Housing Variant could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on-site or off-site, similar to the project. Implementation of the Housing Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of the Housing Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of the Housing Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the Housing Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

The Housing Variant would remove the football stadium from the development plan and relocate 1,350 dwelling units from Candlestick Point to HPS Phase II. Both construction and operational impacts to biological resources would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those under the Project, with the exception of the football stadium due to its removal.

Construction

Development of the Housing Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

The Housing Variant would provide 96.7 of State parkland, the same amount of parkland that would be provided under the Project. However, the Housing Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. HPS Phase II would have 244.6 acres (13 acres more than the Project) of parks and open space. The Sports Field Complex proposed with the Housing Variant would be 65.9 acres, which is 6.2 acres more than proposed under the Project. The 3.7-acre Hunters Point South Park would be constructed in the HPS South district, which is not included in the Project. These additional open space areas would provide additional habitat for common plant and wildlife species. Impacts to common species or habitats would be less than the Project, and remain less than significant, similar to the Project.

Development of the Housing Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur. Similar to the Project, the Housing Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring.

Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the Housing Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the Housing Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation

measures MM BI-14a and MM BI-7b, the Housing Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the Housing Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the Housing Variant would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Housing Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

■ Public Services

Construction

Police and Fire Services

Similar to the Project, access to the Housing Variant site during construction would be maintained by implementation of a CMTP as required in MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the Housing Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the Housing Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of the Housing Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Project would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the Housing Variant would be similar to construction of the Project, no impact to school or library services during construction of the Housing Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police

Operational impacts to police services would be similar to the Project in as much as they would be considered less than significant. However, the Housing Variant would result in the removal of the previously programmed football stadium, which would relieve the police department of events at which their presence would be required (approximately 12 game day and 20 other events annually). Therefore, impacts to police protection services would be less than the Project, and still less than significant.

The Housing Variant would remove the football stadium from the development program and relocate 1,350 dwelling units from the Candlestick Point site to the HPS Phase II site. As the Housing Variant would not increase the number of residential units developed, the permanent resident population would not be increased above that anticipated with the Project. Therefore, all impacts anticipated with the Project would be anticipated for the Housing Variant. However, due to the removal of the football stadium, the number of employees anticipated in the area at full build-out with the Housing Variant would be reduced by 359 thereby reducing the temporary, daytime population requiring police services. Furthermore, police presence and services would no longer be needed at the maximum twelve home game day events anticipated by the NFL for the football stadium. Patrolling this area and responding to calls would require at the least a redeployment of police services within the Bayview District, or within a wider area given the current recommendations for redistricting due to the increase in population from the underlying development program, as with the Project.

Impacts on police protection services are considered significant if an increase in population or development levels result in inadequate staffing levels (as measured by the ability of the SFPD to respond to call loads) and/or increased demand for services that would require the construction or expansion of new or altered facilities that might have an adverse physical effect on the environment. The demand for additional police personnel alone would not be considered a physical environmental impact under the provisions of CEQA.

To estimate personnel requirements for new projects, the SFPD considers the size of the incoming residential population and the expected or actual experience with calls for service from other potential uses of the site. Any potential increase in staffing at the SFPD Bayview Station would be expected to take place throughout the Housing Variant development period with the incremental addition of new housing and new non-residential building space and their occupancy.[1239]

Although the City has no adopted staffing ratio, the existing "level of service" at the SFPD can be determined by comparing citywide police force staffing[1240] to total City population (including both residents and workers). As shown in Table IV-25 (Citywide Number of Police Officers and Estimated Housing Variant [Variant 2] Demand), using a total City population for San Francisco of 1,351,469 and a police department staffing level of 2,033 in 2005, a Citywide ratio of 1 officer per 665 people was calculated.[1241] This ratio when applied to the total projected resident and employee population of the Housing Variant at build-out results in the need for an additional 52 police personnel to provide a comparable level of service, the same as the Project.

Table IV-25 Citywide Number of Police Officers and Estimated Housing Variant (Variant 2) Demand

		Population	*Police Officers*
Citywide (2005)			
Residents		799,302	
Employees		552,167	
	Total	***1,351,469***	***2,033***
Ratio (officer to population)		1:665	
Project (2032)			
Residents		24,465	
Employees		10,378	
	Total	***34,843***	***52[a]***
Ratio (officer to population)		1:665	

SOURCE: The population and households data reported for San Francisco is 2005 data provided in a Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009; SFPD 2005 total staffing: PSSG District Station *Boundaries Analysis*, 2008; Proposed population and employment: Section III.C.

a. The projected number of police officers for the R&D Variant is rounded up, and most closely reflects the 1:665 ratio of the Project.

The SFPD evaluates the need for additional officers by sector, and not station or district needs. The area with the Housing Variant covers two of the five sectors within the Bayview District, both of which have been identified as high demand areas. While it is unlikely that 52 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development with the Housing Variant.

[1239] PBSJ Meeting with SFPD on April 22, 2008.

[1240] Using a Citywide police force staffing number accounts for the mixed-use nature of the Project, which would include a substantial daytime and resident or nighttime population.

[1241] City population was calculated as a 2005 population of 799,302 plus 2005 employment of 552,167; refer to Table III.C-1 (Existing Population [2005]) and Table III.C-3 (Existing Employment [2005]) of Section III.C (Population, Housing, and Employment).

Staffing increases, in and of itself, would not constitute a significant environmental impact; however, the construction of new facilities to serve the additional 52 police officers could create an environmental effect. Additional SFPD personnel needed to serve the Housing Variant would require a station from which to operate. The exact amount of space that would be needed has not yet been determined. However, using an estimate of 110 square feet per person,[1242] the additional 52 police officers would require approximately 6,000 square feet of interior building space. Additional space would be required for staff and visitor parking. According to the SFPD, there is limited excess capacity at the existing Bayview Station, and the station would not be able to accommodate all 52 of the additional police officers without the reconfiguration and expansion of the existing station or the construction of a new facility.[1243] In addition, the current surface parking lot is not adequate for existing personnel. Structured parking could be provided on the existing parking site.

Currently, the SFPD has no plans for expansion of its Bayview Station. According to the *Boundaries Analysis*, the Bayview Station is not among the priorities for replacement, expansion, improvement, or correction of current deficiencies. However, according to Public Safety Strategies Group (PSSG), there is a considerable amount of wasted or unused space at the Bayview Station that could be reconfigured to accommodate additional officers.[1244] If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 square feet (the same as the Project) could be constructed within the Housing Variant area, on land designated for community serving uses. As part of the Housing Variant, up to 100,000 gross square feet (gsf) of land divided equally between Candlestick Point and HPS Phase II would be designated for community serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. With the construction of a new facility or a suitable retrofitting or expansion of the Bayview Station, the SFPD would have ample space to accommodate the additional police officers needed to maintain the SFPD's existing level of service. Therefore, while the development of the Project may require new or physically altered police facilities in order to maintain acceptable police services, the potential impacts associated with the construction of a new facility have been addressed in this EIR and would not require further environmental review. Therefore, the anticipated development would not require new or physically altered police facilities beyond the scope of the Housing Variant in order to maintain acceptable police protection services and therefore, operational impacts to police protection services would be less than significant, similar to the Project.

Fire Protection Services

Operational impacts to fire protection and emergency medical services would be similar to the Project in as much as they would be considered less than significant. The Housing Variant would remove the football stadium from the development plan and would relocate 1,350 housing units from Candlestick Point to HPS Phase II. This would result in the potential for lower buildings, both at Candlestick Point and HPS Phase II, which could reduce potential impacts to fire services. Additionally, the Housing Variant would result in a smaller, daytime population because the number of employees at the site would be reduced by 359 as a result of removal of the football stadium development. Additional fire protection resources that

[1242] The Bayview Station is approximately 16,000 gsf, and the capacity is about 140 officers, resulting in about 114 sf per officer.
[1243] Personal communication, John Loftus, Captain, Bayview District Station to Allison Wax, PBS&J, August 31, 2009.
[1244] PBSJ Meeting with SFPD on April 22, 2008.

would be required to patrol the football stadium on game days with the Project would not be required with the Housing Variant, thereby reducing that potential impact. Therefore, impacts to fire would be similar to the Project.

The number of housing units would not be increased with the Housing Variant, and the permanent resident population would not be increased above that anticipated with the Project. Buildings on the HPS Phase II site would be 40 to 65 feet high, similar to proposed adjacent development. This would be lower than the 156-foot maximum height anticipated with the football stadium. On the Candlestick Point site, the majority of buildings would remain 65 feet. However, the number and location of towers would be reduced. The reduction in building height would reduce potential impacts to fire protection services.

Building Safety

Similar to the Project all new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help to minimize the demand for future fire protection services. The Housing Variant development plan differs from the Project in that the football stadium programmed for the Project would be removed and 1,350 dwelling units would be relocated from Candlestick Point to HPS Phase II. These uses would be provided primarily in buildings that would have a maximum allowable height ranging between 40 feet and 65 feet at both Candlestick Point and HPS Phase II, as shown on Figure IV-8. At Candlestick Point, the number and location of towers would be reduced. Plan review for all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services. In addition, development of the Housing Variant would include expansion of the AWSS to provide water infrastructure for firefighting activities. Therefore, the Housing Variant would result in a less than significant operational impact to fire services due to building safety.

Response Time

As discussed with the Project, existing SFFD facilities in the Bayview neighborhood would provide adequate response times to most points within Candlestick Point and no new or physically altered fire or emergency medical facilities would be required in order to maintain an acceptable level of service. However, portions of the proposed development at HPS Phase II would be at a distance from existing fire stations including those most proximate to the site (Stations 44 and 17), which could result in the SFFD taking anywhere from 8 minutes to 14 minutes to access the HPS Phase II site in the event of an emergency. The SFFD strives to maintain a Code 3 emergency response time of 4.5 minutes, which may not be accommodated due to the distance of the nearest station from the HPS Phase II site. As such, a new fire station located in closer proximity to the HPS Phase II site would be needed to ensure adequate response times for HPS Phase II. The SFFD does not consider response time to the furthest point of the HPS Phase II site to be acceptable, given the density of proposed development and the distance from the nearest fire station.[1245] However, the Housing Variant would decrease the daytime population in this area by 359 people, which would reduce the potential impact to the existing SFFD resources. SFFD staff concluded that a fire station would be needed at a site that would offer more rapid response to the HPS Phase II site. Initial SFFD recommendations for such a station included providing one engine (four staff), one truck

[1245] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.

(five staff), and one ambulance (staff requirements not indicated). Both Station 9 and Station 17 include one engine and one truck, and their approximate building size is 6,100 gsf and 6,000 gsf, respectively. Neither station includes an ambulance. A new approximately 6,000-gsf SFFD station could be accommodated within the Housing Variant site, on land designated for community serving uses. As part of the Housing Variant, up to 100,000 gsf of land divided equally between Candlestick Point and HPS Phase II would be designated for community serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. The Applicant has designated a total of 5.3acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the Housing Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1246] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, the anticipated development would not require new or physically altered fire facilities in order to maintain acceptable fire protection services and operational impacts to fire protection services would be less than significant, similar to but potentially less than the Project.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school aged children that would require adequate school services would be approximately similar to the Project. Impacts from the Housing Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Additionally, the Housing Variant would result in 359 less employees due to the loss of the football stadium. Therefore, the service population for the existing library facilities would be the same, if not less, than the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under

[1246] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, the Housing Variant would result in a less than significant operational impact to library services, similar to the Project.

Recreation

The Housing Variant would include the construction and improvement of new parks, recreational facilities, and open space. At buildout of this Variant, approximately 349.4 acres of parks, open space, and recreational uses would be provided, as described in Table IV-21, which is about 13 acres more than proposed with the Project. The Sports Field Complex with the Housing Variant would be 94.7 acres, about 3.1 acres more than the Sports Field Complex proposed with the Project, and a total of 158 acres of parkland would be provided, about 9.9 acres more than proposed with the Project.

Construction impacts related to recreational facilities would be the substantially the same as those identified with the Project because the construction activities would be substantially similar, with the Housing Variant requiring slightly more construction due to the provision of about 13 acres more of parkland.

The Housing Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465, although 13 acres more of parkland would be provided. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Housing Variant would be 14.2, which is 0.5 more than with the Project. The Housing Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

Park Phasing

The timing of Housing Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities.

The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table IV-26 (Housing Variant Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Housing Variant). As this table indicates, the park-to-population ratio would not drop below 14.3 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Table IV-26 demonstrates that adequate parkland would be provided during each stage of development. However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is

conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

Table IV-26 Housing Variant Residential Units and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*
Existing	256	1,113[a]	120.2	108
Phase 1	3,005	7,002[b]	137.1	19.6
Phase 2	7,185	16,741[b]	275.6	16.5
Phase 3	9,400	21,902[b]	348.6	15.9
Phase 4	10,500	24,465[b]	349.4	14.3

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Employment, and Housing). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.
b. Calculated as 2.33 people per residential unit.

Senate Bill 792 (SB 792) (refer to Appendix P2) was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002,* the *Hunters Point Shipyard Public Trust Exchange Act,* and *Public Resources Code* Section 5006.8, and consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. These additional acres would widen the park at in an area where the CPSRA boundary currently runs very close to the shoreline, creating a very narrow "pinch point" in the park. The additional acreage would thus create a buffer between development and the shoreline and improve the recreational value of this section of the park. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres, which is the same as the Project.

While the reconfiguration of CPSRA would remove a net of 29.2 acres from the park, all of that acreage is degraded or unimproved (and not maintained) and does not provide substantial recreation opportunities to the community. Most of the land that would be removed from CPSRA is either currently used for stadium parking or is directly adjacent to Harney Way. The reconfiguration would add 5.7 acres of new parkland in The Last Port, The Neck, and The Heart of the Park, all areas that are currently developed and actively used that have high value as recreational resources. This additional acreage would widen the park at this important point, increasing its capacity for new users. Although there would be a net decrease in the total area of the CPSRA, that portion of the CPSRA that is currently developed and used for recreational purposes would be further expanded (by 5.7 acres) and improved.

Moreover, the Housing Variant would provide substantial improvements throughout the CPSRA. These improvements, which are described at length in the discussion of Impact RE-2, include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), the provision of habitat and opportunities for environmental education, "Eco-Gardens," and salt-marsh restoration. Figure III.P-8 shows the existing unimproved and improved areas of the CPSRA and indicates where land would be removed or added relative to the existing CPSRA uses. These improvements would turn portions of the Park that are used for Candlestick Park stadium parking or are undeveloped and underutilized into vibrant parts of the CPSRA and of the overall network of parks. Currently improved parts of the CPSRA, such as The Heart of the Park, The Point, The Neck, and The Last Port, would also be improved. Overall, the reconfiguration and improvements would enhance park aesthetics and landscape ecology; provide connections throughout the CPSRA and the other parks; and provide direct access to the Bay and the Bay shoreline for walking, swimming, fishing, kayaking, and windsurfing. The Variant's proposed reconfiguration of the CPSRA, therefore, would not adversely affect the park's existing recreational facilities and opportunities.

The improvement and development of the CPSRA is expected to increase usage of CPSRA by visitors. While the number of additional visitors cannot be accurately predicted at this time, the Project's improvement will increase the amount of land at CPSRA that provides recreational opportunities (as discussed above), and will thus enable the park to accommodate the new demand. Moreover, the agreement between CDPR and the City or the Agency, providing for the reconfiguration of CPSRA, would also provide at least $10 million in funding for operation and maintenance of the park, further enabling the park to accommodate increased demand.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Housing Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). The Variant would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Housing Variant would be substantially similar to the Project.

Utilities

Water

The operational activities of the Housing Variant would be similar to those of the Project, inasmuch as there would be temporary, daytime populations at the Housing Variant site and full-time residential populations that generate retail water demand from SFPUC.

With the Housing Variant, the football stadium proposed with the Project for the HPS Phase II site would be removed and 1,350 housing units would be relocated from the Candlestick Point site to the HPS Phase II site. The Housing Variant would not generate additional permanent residents over that of the Project. Additionally, the Housing Variant would result in the loss of 359 jobs due to removal of the football stadium. This would decrease the potential water consumption from the site. As shown in Table IV-27 (Housing Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance [mgd]), the Housing Variant would consume approximately 1.66 mgd of water. With existing water use at the CP-HPS Phase II site of 0.3 mgd, the net change in water demand with the Housing Variant would be an increase of 1.36 mgd, a decrease of 0.01 mgd compared to Project.

Table IV-27 Housing Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance (mgd)

Land Use	*Candlestick Point*	*Hunters Bay Shipyard*	*Total*
Residential	0.51	0.33	0.83[a]
Hotel	0.05	0.00	0.05
Office	0.04	0.02	0.04
Artists Studios	0.00	0.01	0.01
R&D	0.00	0.36	0.36
Neighborhood Retail	0.02	0.02	0.03[a]
Regional Retail	0.08	0.00	0.08
Community Uses	0.01	0.01	0.02
Football Stadium	0.00	0.00	0.00
Performance Venue	0.01	0.00	0.01
Subtotal	*0.71[a]*	*0.73[a]*	*1.45[a]*
Parks and Open Space	0.06	0.15	0.22
Total Demand	***0.77[a]***	***0.88[a]***	***1.66***

SOURCE: Arup, Candlestick Point–Hunters Point Shipyard Phase II Water Demand Memorandum, October 15, 2009.

a. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals used in this table. These entries are correct and are consistent with Table 13 of the Water Demand Memorandum.

As with the Project, sufficient treatment capacity would continue to be available to meet the likely future water treatment needs of the entire Regional Water System, and thereby meet retail demand for water treatment, including the net increase of 1.36 mgd for the Housing Variant. As the current and planned treatment capacity of existing RWS water treatment facilities is sufficient to serve the Housing Variant, implementation of this variant would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant, similar to the Project.

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the Housing Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed

in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1247] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1248,1249] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Housing Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

Wastewater

The construction impacts of the Housing Variant would be substantially similar to the Project because the types of land uses and construction activities required with both would be similar.

The operational activities of the Housing Variant would be similar in nature to those of the Project as the land uses and quantities of these land uses would be approximately similar. The Housing Variant would replace existing wastewater conveyance infrastructure within the site to adequately serve the Housing Variant.

With the Housing Variant, the football stadium proposed with the Project for the HPS Phase II site would be removed and 1,350 housing units would be relocated from the Candlestick Point site to the HPS

[1247] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.

[1248] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.

[1249] SFPUC, Urban Water Management Plan, 2005.

Phase II site. The Housing Variant would not generate additional permanent residents over that of the Project. Additionally, the Housing Variant would result in the loss of 359 jobs due to removal of the football stadium. This would decrease the potential wastewater generation from the site. As shown in Table IV-28 (Housing Variant Wastewater Generation), the Housing Variant would result in the generation of 1.16 mgd of wastewater, a decrease of 0.02 mgd of wastewater from the Project.

Table IV-28 Housing Variant Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed as % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total Housing Variant (mgd)*
Residential	95%	0.48	0.31	0.79
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.21	0.21
Hotel	57%	0.03	0	0.03
Football Stadium	95%	0	0	0
Performance Venue	95%	0.01	0	0.01
Total		***0.61***	***0.55***	***1.16***

SOURCE: Arup, October 15, 2009.

The 1.16 mgd of wastewater projected for operation of the Housing Variant would be transported via new or expanded conveyance systems within the Housing Variant site and existing mains to the SWPCP.[1250] The existing wastewater/stormwater conveyance lines between the HPS Phase II site and the SWPCP are sized to accommodate both dry- and wet-weather flows. Wastewater from the Housing Variant would flow into the Hunters Point Tunnel (from the HPS Phase II site) and the Candlestick and Hunters Point tunnel sewer (from the Candlestick Point site). The Hunters Point tunnel sewer has an average dry-weather flow of 6 mgd (4,167 gpm) and a design capacity of 120 mgd (83,333 gpm) (refer to Table IV-29 [Sewer Trunk Capacity and Housing Variant Maximum Peak Flows]).[1251] Peak dry-weather flow capacities can be calculated by multiplying the average gallons-per-minute flow by a peaking factor. For purposes of this analysis, a conservative peaking factor of 3.0 was used, which yields a maximum flow capacity of 12,501 gpm for the Hunters Point tunnel sewer. Projected maximum peak flows from the HPS Phase II development with the Housing Variant, based on a peaking factor of 3.0, would be 1,146 gpm[1252]. The remaining capacity of the Hunters Point tunnel sewer is 83,333 gpm. Therefore, the addition of 1,146 gpm peak flow from the HPS Phase II development with the Housing Variant would be accommodated within the remaining capacity of the Hunters Point tunnel sewer (83,333 gpm).

[1250] *Candlestick Point/ Hunters Point Shipyard Infrastructure Concept Report* (October 26, 2009) prepared by Winzler & Kelly Consulting Engineers.
[1251] San Francisco Public Utilities Commission, Bayside Operations Plan, 2002.
[1252] Calculated as 0.55 MGD/24 hours/60 minutes * 3.0*1,000,000.

Table IV-29 Sewer Trunk Capacity and Housing Variant Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Variant Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With Housing Variant*
Candlestick tunnel sewer	34,722	1,736	5,208	1,270	28,244[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	1,145	69,687[f]

SOURCE: Bayside Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that will be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project will be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that will be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project will be somewhat greater than 69,853 gpm.

The Candlestick Point development would discharge a maximum peak flow of 1,271 gpm of wastewater into the off-site Combined Sewer System.[1253] During wet-weather conditions, the off-site Combined Sewer System would accommodate both wastewater and stormwater flows, as it does currently. The Combined Sewer System is designed to accommodate wet-weather flows, and the Candlestick tunnel sewer has a maximum flow capacity of 34,722 gpm and the Hunters Point tunnel sewer (into which discharges in the Candlestick tunnel sewer flow) has a maximum flow capacity of 83,333 gpm. The contribution of 1,271 gpm maximum peak flow from Candlestick Point represents only 3.7 percent of the total design capacity of the Candlestick tunnel sewer. Therefore, the Housing Variant would result in a less-than-significant impact to wastewater conveyance, similar to the Project.

Because the existing conveyance infrastructure could accommodate the additional flows from the Housing Variant development in addition to existing flows even during periods of peak flows, no expansion of the off-site wastewater conveyance lines would be required as a result of the Housing Variant development, similar to the Project.

The contribution of the Housing Variant to the Bayside system represents a small percentage of its available capacity and would be accommodated by the existing infrastructure. Although development of the Housing Variant would increase wastewater flows (as intermittent flows from Candlestick Park stadium would be replaced by year-round flows from mixed-use development), the provision of separate stormwater and sewer systems would reduce overall wet-weather volumes to the Combined Sewer System.

The land use program and associated stormwater flows from the Candlestick Point site would be the same with the Housing Variant as with the Project. Therefore, treatment of stormwater would also be the same as with the Project. Stormwater from the HPS Phase II site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during

[1253] Calculated as 0.61 MGD/24 hours/60 minutes * 3.0*1,000,000.

wet weather. With the Housing Variant, stormwater would continue to be collected and treated in a separate stormwater system, and no stormwater runoff would be contributed to the Combined Sewer System during wet weather. Although development with the Housing Variant at the HPS Phase II site would result in a net increase in wastewater flows, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP.

The increase in wastewater generation with the Housing Variant would incrementally contribute to the total amount of wet-weather flows that are collected and treated at the SWPCP, the North Point Wet Weather Facilities (NPWWF), and the Bayside Wet Weather Facilities. When the combined storage and treatment capacity of those facilities are exceeded, wastewater from the Housing Variant development could be discharged, along with other wet-weather flows from the combined system, via the CSOs located around the perimeter of San Francisco. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact would be less than significant, similar to the Project.

The land use program and associated stormwater flows from the Housing Variant site would be the same with the Housing Variant as with the Project and would not increase, further being reduced by the removal of the football stadium. Therefore, treatment of this stormwater would also be the same as with the Project. Stormwater from the HPS Phase II site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With the Housing Variant, stormwater would continue to be collected and treated in a separate stormwater system, and no stormwater runoff would be contributed to the Combined Sewer System during wet weather. Although development with the Housing Variant at the HPS Phase II site would result in a net increase in wastewater flows of 0.55 mgd, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP. Stormwater from Candlestick Point would be reduced when compared to the Project and would be taken by the Combined Sewer System. This would not change with the Housing Variant.

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the Housing Variant would be treated at the SWPCP wastewater treatment plant and the SFPUC, who operates the SWPCP wastewater treatment plant, is required to comply with waste discharge requirements (WDRs) set by the RWQCB, which specify the allowable levels of pollutants in discharges from the facility. Compliance with any applicable WDRs, as monitored and enforced by the SFPUC, would ensure that the Housing Variant does not exceed the applicable wastewater treatment requirements of the RWQCB, and this impact would be less than significant, similar to the Project.

Solid Waste

Construction wastes with the Housing Variant, including demolition and hazardous wastes, would be similar to that generated with the Project because the materials used for construction would be substantially similar for both. Construction waste would be sorted, prior to disposal, to ensure that all recyclable

materials are salvaged from the waste stream that is ultimately taken to a landfill. Incorporation of mitigation measure MM UT-5a (Construction Waste Diversion Plan) would ensure that impacts to solid waste during construction are reduced to a less-than-significant level.

Operation

Operational impacts of the Housing Variant would be substantially similar to the Project because the amount and type of solid waste generated would be similar based on similar land uses, recycling activities would be implemented with both projects, and neither project would result in the exceedance of current landfill capacities. With the Housing Variant, the football stadium proposed for the HPS Phase II site would be removed and 1,350 dwelling units would be relocated from the Candlestick Point site to the HPS Phase II site. As shown in Table IV-30 (Housing Variant Solid Waste Generation), the Housing Variant would result in 7,512 tons of waste at full build-out of the HPS Phase II site and 12,222 tons of solid waste at full build-out of the Candlestick Point site, for a total of 19,734 tons of waste annually. This is a decrease of 768 tons of waste annually due to removal of the football stadium. This total waste stream would constitute 3.1 percent of the City's total waste stream.[1254] The increase in solid waste generation associated with the Housing Variant development would not be substantial in the context of citywide solid waste infrastructure demand.

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste. The City has a contract with Altamont Landfill to accept the City's waste through 2014. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1255]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs.

[1254] California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Accessed online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008. 627,157 total tons of solid waste in 2007.

[1255] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.

Table IV-30 Housing Variant Solid Waste Generation

Use	Generation Factor (per day)	Candlestick Point			HPS Phase II			Total		
		Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year or per Total Number of Events[a]
Residential	5.653 lbs/unit	6,500 units	18.4	6,716	4,000 units	11.3	4,124.5	10,500 sf	29.7	10,840.5
Retail	0.02600411 lbs/sf	760,000 sf	9.9	3,613.5	125,000 sf	1.6	584.0	885,000 sf	11.5	4,197.5
Office	0.006 lbs/sf	150,000 sf	0.5	182.5	0	0	0	150,000 sf	0.5	182.5
Hotel	0.0108 lbs/sf	150,000 sf	0.8	292.0	0	0	0	150,000 sf	0.8	292.0
R&D	0.006 lbs/sf	0	0	0	2,500,000 sf	7.5	2,737.5	2,500,000 sf	7.5	2,737.5
Performance Venue	2.23 lbs/seat	10,000 seats	5.6[b]	836.3[c]	0	0	0	10,000 seats	5.6	836.3[c]
Stadium	2.23 lbs/seat	0	0	0	0	0	0	0	0	0
Art Center	0.006 lbs/sf	0	0	0	255,000 sf	0.8	292	255,000 sf	0.8	292.0
Community Facilities	0.006 lbs/sf	50,000 sf	0.15	54.8	50,000 sf	0.15	54.8	100,000 sf	0.3	109.6
Total				***11,695.1***			***7,792.8***			***19,487.9***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

a. Calculated by adding the horizontal columns, rather than calculating total number of units by the generation rate.
b. The Performance venue is projected to be 50 percent attendance.
c. Assumes 150 events per year at 50 percent attendance. Attendance estimate is based on CABER, Towson University & Sage Policy Group, Inc., *The Economic Feasibility of a Montgomery County, MD Arena*, June 2007.
d. Assumes a sold-out event with a 5 percent "no-show" rate.
e. Assumes 12 sold-out games and 20 other sold-out stadium events per year.

- As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1256] Demolition activities, which generate construction debris, are expected to conclude in 2028 at Candlestick Point and in 2023 at HPS Phase II, one year before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Housing Variant on solid waste would be further reduced. The impact of the construction waste generated by the Housing Variant on the capacity of the Altamont Landfill would be less than significant.

Typical municipal solid waste has a landfill density of 739 pounds per cubic yard.[1257] Using this density factor, 45.7 million cubic yards of remaining capacity at the Altamont Landfill would be equivalent to 33.7 million tons of remaining capacity. The contribution of 19,488 tons annually of solid waste with the Housing Variant development would represent only 0.02 percent of the remaining capacity of the identified landfills. Additionally, approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1258] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1259] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes. The City has prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals. These strategies would be utilized to achieve the City's overall waste reductions goals. The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

All residents and businesses with the Housing Variant would be expected to comply with the City's waste and recycling ordinances. On the basis of the landfill capacity and diversion strategies noted above, and with implementation of the comprehensive waste diversion strategies, as well as implementation of mitigation measure MM UT-71 (Site Waste Management Plan), the Housing Variant would result in a less-than-significant impact to solid waste, similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into the Project site. This could include a new substation within the project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and

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[1256] CIWMB, 2009.
[1257] http://wasteage.com/mag/waste_municipal_solid_waste/ (accessed September 29, 2009).
[1258] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco (accessed: November 5, 2008).
[1259] San Francisco, *Waste Characterization Study: Final Report.* 2008.

Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Housing Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the Housing Variant, similar to the Project.

Energy

Construction

Construction activities of the Housing Variant would be similar to the Project as the construction equipment usage, types of energy resources needed, type of construction activities, and construction timeline would be similar.

The construction activities proposed with the Housing Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, construction activities would not be large in comparison to a project of a similar size and with similar land uses, and the Housing Variant would result in a less-than-significant impact, similar to the Project.

Operation

Electricity

The operational impacts of the Housing Variant would be similar to the Project because the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the Housing Variant would result in the demand for less electricity than the Project; therefore, impacts would be less (about 12 percent less). As discussed in Section III.R, the operational impacts of a project are considered significant if it encourages activities that result in the use of large amounts of energy or uses such resources in a wasteful manner. The criterion for this impact considers whether the Housing Variant would result in a large increase in electricity consumption. As shown below in Table IV-31 (Housing Variant Electricity Demand from Building Envelopes [MWh]), the Housing Variant would be expected to result in an electricity demand of approximately 30,895 Megawatt hours (MWh). While about 12 percent less than the Project, this would not be a large overall increase in consumption over the existing conditions of 9,990 MWh; however, two uses (residential and R&D) would account for 86 percent of the increase in demand for electricity at the site. R&D uses would be the largest source of electricity consumption at HPS Phase II, while residential units would be the largest source of electricity consumption

Table IV-31 Housing Variant Electricity Demand from Building Envelopes (MWh)

		Candlestick Point			HPS Phase II			Project Site Total			
Type of Use	*Electricity Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]*	*Development Program[b]*	*MWh Consumed Annually, 2008 Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program[b]*	*MWh Consumed Annually, Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program*	*MWh Consumed Annually, Title 24 Standards*	*MWh Consumed Annually, with 15% Reduction*	*Percent of Total Electricity by Land Use*
Residential Units	1.7350[d]	7,850	13,620	11,577	2,650	4,598	3,908	10,500	18,218	15,485	50%
Retail	0.0027	635,000	1,715	1,457	—	0	0	635,000	1,715	1,457	8%
Neighborhood Retail	0.0027	125,000	338	287	125,000	338	287	250,000	675	574	2%
Office	0.0052	150,000	780	663	—	0	0	150,000	780	663	2%
R&D	0.0052	—	0	0	2,500,000	13,000	11,050	2,500,000	13,000	11,050	36%
Hotel	0.0027	220	1	1	—	0	0	220	1	1	0%
Artist Studios/ Center	0.0052	—	0	0	255,000	1,326	1,127	255,000	1,326	1,127	4%
Community Space	0.0052	50,000	260	221	50,000	260	221	100,000	520	442	1%
Arena	0.0015	75,000	113	96	—	0	0	75,000	113	96	0%
Total			***16,825***	***14,301***		***19,522***	***16,593***		***36,348***	***30,895***	***100%***

SOURCES:

Housing Variant electricity demand was estimated based on the Applicant's commitment to achieve 15 percent energy reductions below Title 24 standards and use ENERGY STAR appliances in all residential units.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, July 2009, Table 3-8. The factor was derived by subtracting the "Plug-in" factor from the "Electricity Delivered, Total" column (in the "15 percent Better than Title 24 2008 and ENERGY STAR Appliances" row). The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. Based on buildout floor areas provided in Table IV-19 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16. The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

at Candlestick Point. Because R&D uses result in heavy electricity consumption during peak daytime hours (largely due to HVAC, lighting, and the operation of office equipment), the Housing Variant could generate high levels of peak demand, similar to the Project.[1260]

Taking the Housing Variant's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as well as the level of development proposed, the electricity increase associated with the Housing Variant would not be considered large.

The City's threshold also considers whether the Housing Variant's energy consumption would be wasteful. The efficiency measures proposed under the Housing Variant would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the Housing Variant's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the Housing Variant's voluntary implementation of LEED® for Neighborhood Development (LEED® ND) standards based on the Pilot Version of the rating system released in June 2007.[1261] However, because the Housing Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Housing Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less than significant.

The City's significance criterion also considers whether a project's energy consumption would be wasteful. The efficiency measures proposed with the Housing Variant would result in less electricity consumption than a project that would not implement such measures. These measures include installation of ENERGY STAR appliances, a measure aimed at reducing residential electricity consumption, which as discussed in the preceding paragraph, is a land use with correspondingly high energy consumption. Therefore, the Housing Variant has demonstrated a good faith effort to avoid wasteful consumption of energy for residential uses. In addition, as discussed in the preceding paragraph, the Housing Variant Applicant would be required to comply with the City's Green Building Ordinance and has committed to pursuing LEED® ND credits.[1262] Thus, electricity consumption with the Housing Variant development would be considered efficient and not wasteful. Operational electricity impacts would be less than significant, similar to the Project.

[1260] Although the Housing Variant would include on-site electricity infrastructure, local delivery infrastructure is supplied by larger transmission lines, substations, and generation facilities owned by PG&E and other entities. Adding new connections to the overall power grid, thereby increasing demand on the grid, contributes to the need for periodic infrastructure upgrades. More importantly, because electricity cannot be stored once it is generated, the need for development of additional electricity generation sources is largely dependent on the peak level of conveyance. Designing electricity infrastructure is similar to designing highways, which are sized to convey rush-hour demand.

[1261] Since the initial release of the ND standard, the rating system has undergone two public comment periods, and several credit requirements have changed. The LEED® ND rating system is currently being finalized for formal release by the USGBC.

[1262] Savings associated with these features cannot be calculated until the designs of individual buildings have been completed.

Natural Gas

The operational impacts of the Housing Variant would be similar to the Project as the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the Housing Variant would result in the demand for 11 percent less than the natural gas demand of the Project.

Table IV-32 (Housing Variant Natural Gas Demand, Baseline [MBtu]) presents the annual natural gas use for the Housing Variant, estimate based on land use and minimal compliance with Title 24 standards as well as the Housing Variant Applicant's preliminary commitment to reduce energy use to 15 percent below Title 24 standards. The natural gas demand associated with the Housing Variant would be approximately 56,063 MBtu, in comparison to a similarly sized project that would not include the 15 percent reduction below 2008 Title 24 standards and which would result in consumption of approximately 66,670 MBtu of natural gas use annually. However, this is approximately 7,200 MBtu less than the Project.

The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly five times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the Housing Variant would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

However, because the Housing Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Housing Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

All natural gas impacts would be less than significant, similar to the Project.

Similar to the Project, the Housing Variant would increase trips to and from the site, increasing the use of petroleum fuels. However, this consumption would not be wasteful because (1) the Housing Variant proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements, (2) the Housing Variant would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips, and (3) the Housing Variant would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as the overall trip lengths. Therefore, the Housing Variant would result in a less-than-significant impact due to the wasteful use of transportation-related fuels, similar to the Project.

Table IV-32 Housing Variant Natural Gas Demand, Baseline (MBtu)

		Candlestick Point			HPS Phase II			Project Site Total			
Type of Use	*Natural Gas Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)*[a]	*Development Program*[b]	*MBtu Consumed Annually, 2008 Title 24 Standards*[c]	*MBtu Consumed Annually, with 15% Reduction*	*Development Program*[b]	*MBtu Consumed Annually, 2008 Title 24 Standards*[c]	*MBtu Consumed Annually, with 15% Reduction*	*Development Program*	*MBtu Consumed Annually, 2008 Title 24 Standards*[c]	*MBtu Consumed Annually, with 15% Reduction*	*Percent of Total by Land Use*
Residential Units	0.0360[d]	7,850	283	240	2,650	95	81	10,500	378	321	1%
Retail	0.0048	635,000	3,048	2,591	—	—	—	635,000	3,048	2,591	5%
Neighborhood Retail	0.0048	125,000	600	510	125,000	600	510	250,000	1,200	1,020	2%
Office	0.0200	150,000	3,000	2,550	—	—	—	150,000	3,000	2,550	5%
R&D	0.0200	—	—	—	2,500,000	50,000	42,500	—	50,000	42,500	76%
Hotel	0.0345	220	8	6	—	—	—	220	8	6	0%
Artist Studios/ Center	0.0200	—	—	—	225,000	4,500	3,825	225,000	4,500	3,825	7%
Community Space	0.0200	50,000	1,000	850	50,000	1,000	850	100,000	2,000	1,700	3%
Arena	0.0243	75,000	1,823	1,549	—	—	—	75,000	1,823	1,549	3%
Total			***9,761***	***8,297***		***56,909***	***47,766***		***66,670***	***56,063***	***100%***
Percent of Total			***15%***			***85%***			***100%***		

SOURCES:

Baseline Housing Variant natural gas demand was estimated based on land use and basic compliance with 2008 Title 24 standards.

a. The natural gas factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16. The factors are in the "Overall Based on 2008 Title 24" column. The factors were converted from kBtu to MBtu.

b. Based on buildout floor areas provided in Table IV-19 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The natural gas factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, July 2009, Table 3-8. The factor is in the "Natural Gas Delivered, Total" column and the "Minimally Title 24 Compliant (2008)" row. The factor was converted from kBtu to MBtu (1 MBtu = 1,000 kBtu).

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

Greenhouse Gas Emissions

As shown in Table IV-19, the Housing Variant would relocate housing from Candlestick Point to HPS Phase II and no stadium would be constructed. Overall, the level of residential development under this alternative would be the same as the Project. In addition, it should be noted that while the level of neighborhood retail would remain the same, it would be distributed differently throughout the project site. Construction impacts would be substantially similar to the Project. Operational impacts would be similar than those identified under the Project as the redistribution of land uses would result in similar GHG emissions.

Construction

As stated above, overall construction impacts of the Housing Variant with respect to climate change and GHG emissions would be similar to the Project. Construction activities would occur from the use of construction equipment, workers commuting, and soil hauling activities. The GHG emissions associated with the construction activities are short-term in duration and would be a total of 129,274 tonnes CO_2e. When this is distributed over an anticipated time schedule of 20 years, approximately 6,464 tonnes per year would be emitted. Since these emissions are short in duration and small in comparison to the overall construction and mining emissions for the San Francisco Bay Area Air Basin GHG emission inventory, the Housing Variant GHG emissions for construction would be less than significant, similar to the Project.

Operation

Operational impacts to climate change and GHG emissions would be substantially similar to the Project. Under the Housing Variant, the football stadium proposed under the Project would be replaced with relocated housing units at the HPS Phase II site that would decrease the housing units at Candlestick Point. This does not result in any additional units as compared to the Project, but rather redistribution between Candlestick Point and HPS Phase II site. The breakdown in operational GHG emissions for HPS Phase II is shown in Table IV-33 (Housing Variant Annual GHG Emissions).

Table IV-33 Housing Variant Annual GHG Emissions

Source	*Candlestick Point (tonnes CO_2e/year)*	*Hunters Point Shipyard Phase II (tonnes CO_2e/year)*	*Total (tonnes CO_2e/year)*
Residential	15,651	10,026	25,677
Non-Residential	4,263	11,963	16,226
Mobile	75,180	34,888	110,068
Municipal	1,066	1,488	2,553
Area	132	85	217
Waste	451	587	1,038
Transit Area	865	865	1,730
Total (annual emissions)	***97,608***	***59,901***	***157,509***

SOURCE: ENVIRON 2009.

The operational emissions were compared to ARB Scoping Plan No Action Taken Scenario which assumes the site would be developed without implementation of conceptual design features and using regulations in place at the time of the Scoping Plan development. The Housing Variant shows large reductions in GHG emissions due to the mitigation measures that would be implemented. The comparison of the Housing Variant GHG emissions to the ARB Scoping Plan No Action Taken scenario is shown in Table IV-34 (Annual GHG Emissions Comparison of Housing Variant and ARB Scoping Plan No Action Taken Scenario). This shows that due to the improvement in electricity carbon intensity and energy efficiency of the buildings residential GHG emissions would have a 20 percent reduction in emissions and non-residential buildings would have a 15 percent reduction in emissions. Municipal sources are anticipated to be 7 percent lower than the ARB Scoping Plan No Action Taken as a result of reductions in electricity carbon intensity. Mobile source emissions associated with the Housing Variant are a result of trip reductions in automobiles and vehicle emission efficiency regulations resulting in 57 percent reductions compared to the ARB Scoping Plan No Action Taken scenario.

Table IV-34 Annual GHG Emissions Comparison of Housing Variant and ARB Scoping Plan No Action Taken Scenario

Source	*No Action Taken*	*Housing Variant*	*Difference*	*Percent Difference*
Residential	32,286	25,677	6,609	20%
Non-Residential	19,186	16,226	2,960	15%
Mobile	257,568	110,068	147,500	57%
Municipal	2,750	2,553	197	7%
Area	217	217	0	0%
Waste	1,038	1,038	0	0%
Transit Area	2,884	1,730	1,154	40%

SOURCE: ENVIRON 2009. Climate Change Technical Report Candlestick Point-Hunters Point Shipyard Phase II Redevelopment Plan. Table 4-10.

Emissions associated with new public transportation added to the development would have a 40 percent reduction due to the use of diesel-hybrid buses. Since transportation is one of the largest emissions categories in both the statewide and local GHG emissions inventory, the amount of reduction is substantial in the overall reductions anticipated for the Housing Variant. Furthermore, most of the other larger categories also result in substantial reductions in emissions. This indicates that the Housing Variant would not impede the achievement of San Francisco's GHG emission reduction ordinance nor the statewide emission reductions required under AB 32. Therefore, the Housing Variant is less than significant with respect to the cumulative impacts of climate change and GHG emissions.

BAAQMD Draft GHG Thresholds

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the

Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Variant's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Variant and Project.

With mitigation, the Housing Variant-related operational emissions of 157,509 tonnes per year result in 4.6 tonnes CO_2e per service population per year based on a service population of 34,248 (this accounts for 23,869 net new residents and all 10,379 jobs). Therefore, the Project-related operational emissions would be equal to the 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change.

IV.Ca VARIANT 2A: HOUSING/R&D VARIANT (NO STADIUM—RELOCATION OF HOUSING; ADDITIONAL R&D)

IV.Ca.1 Overview

An option to Variant 2 (Housing Variant)—Variant 2A (Housing/R&D Variant)—has been identified that would allow for additional R&D on the stadium site, along with housing, in the event the 49ers do not choose to develop a stadium in the HPS Phase II area. As compared to the Housing Variant (Variant 2), described on pages IV-72 through IV-81 of the Draft EIR), the Housing/R&D Variant (Variant 2A) would relocate 275 residential units from Candlestick Point to HPS Phase II and redistribute 50 residential units within other districts on Candlestick Point. The Housing/R&D Variant (Variant 2A) would not develop the uses in the Jamestown District that would occur under the Housing Variant (Variant 2). If the parcels on the privately owned block in the Jamestown District and the four additional blocks in Candlestick Point North District (currently vacant or developed with an RV park) are not acquired by the Project Applicant, the property owners could develop their property under the BVHP Redevelopment Plan via an Owner Participation Agreement or continue the current non-conforming use. The total amount of residential development would remain at 10,500 units, the same as for the Project and the Housing Variant (Variant 2).

An additional 500,000 sf of R&D use would be constructed on the stadium site as compared to the Housing Variant (Variant 2), for a total of 3,000,000 sf of R&D at the HPS Phase II site. The Project includes 2,500,000 sf of R&D, the R&D Variant (Variant 1) includes 5,000,000 sf of R&D, and the Housing Variant (Variant 2) analyzes 2,500,000 sf of R&D; therefore, the 3,000,000 sf of R&D under the Housing/R&D Variant (Variant 2A) would fall within the range of development programs analyzed by the R&D Variant (Variant 1), the Project, and the Housing Variant (Variant 2).

The total amount of park acreage with the Housing/R&D Variant (Variant 2A) would be 326.6 acres, which represents a decrease of approximately 9.8 acres as compared to the Project (which would provide 336.4 acres), about 22.8 acres less than the Housing Variant (Variant 2), which would provide 349.4 acres, and 0.4 acre less than the R&D Variant (Variant 1), which would provide 327.0 acres, because of increased development on the stadium site. However, the decrease in park acreage would not reduce park acreage below the identified threshold of 5.5 acres of park per 1,000 residents, as further described in this section.

Table IV-19a (Housing/R&D Variant [Variant 2A] Land Use Summary) presents the land use summary for the Housing/R&D Variant. Figure IV-7a (Housing/R&D Variant [Variant 2A] Land Use Plan) illustrates the proposed Housing/R&D Variant (Variant 2A) land uses.

Table IV-19a Housing/R&D Variant (Variant 2A) Land Use Summary

Land Use	*Candlestick Point*	*HPS Phase II*	*Total*
Residential[a]			
Residential Density Range I (15 to 75 units per acre)	940	1,320	2,260
Residential Density Range II (50 to 125 units per acre)	3,855	2,185	6,040
Residential Density Range III (100 to 175 units per acre)	270	460	730
Residential Density Range IV (175 to 285 units per acre)	1,160	310	1,470

Table IV-19a Housing/R&D Variant (Variant 2A) Land Use Summary

Land Use	*Candlestick Point*	*HPS Phase II*	*Total*
Total (units)	***6,225[b]***	***4,275[c]***	***10,500***
Retail			
Regional Retail (gsf)	635,000	N/A	635,000
Neighborhood Retail (gsf)	125,000	125,000	250,000
Total (gsf)	***760,000***	***125,000***	***885,000***
Office (gsf)	150,000	N/A	150,000
Research & Development	***N/A***	***3,000,000***	***3,000,000***
Hotel (gsf)	150,000	N/A	150,000
Rooms	220	N/A	220
Artists' Studios/Art Center (gsf)	N/A	255,000	255,000
Community Services (gsf)[d]	50,000	50,000	100,000
Parks & Open Space			
New Parks (acres)	8.1	150.9	159.0
New Dual-Use Sports Fields/Multi-Use Lawn and Stadium Parking and Waterfront Recreation (acres)	N/A	70.9	70.9
New and Improved State Parkland (acres)	96.7	N/A	96.7
Total (acres)	***104.8***	***221.8***	***326.6***
Marina (slips)	N/A	300	300
Performance Venue/Arena (gsf)	75,000	N/A	75,000
Seats	10,000	N/A	10,000
Parking (spaces)			
Residential (structured)	6,225	4,275[e]	10,500
Commercial (structured)	2,346	4,428	6.774
General and Commercial (on-street)	1,360	1,428	2,788

SOURCE: Lennar Urban, 2010.

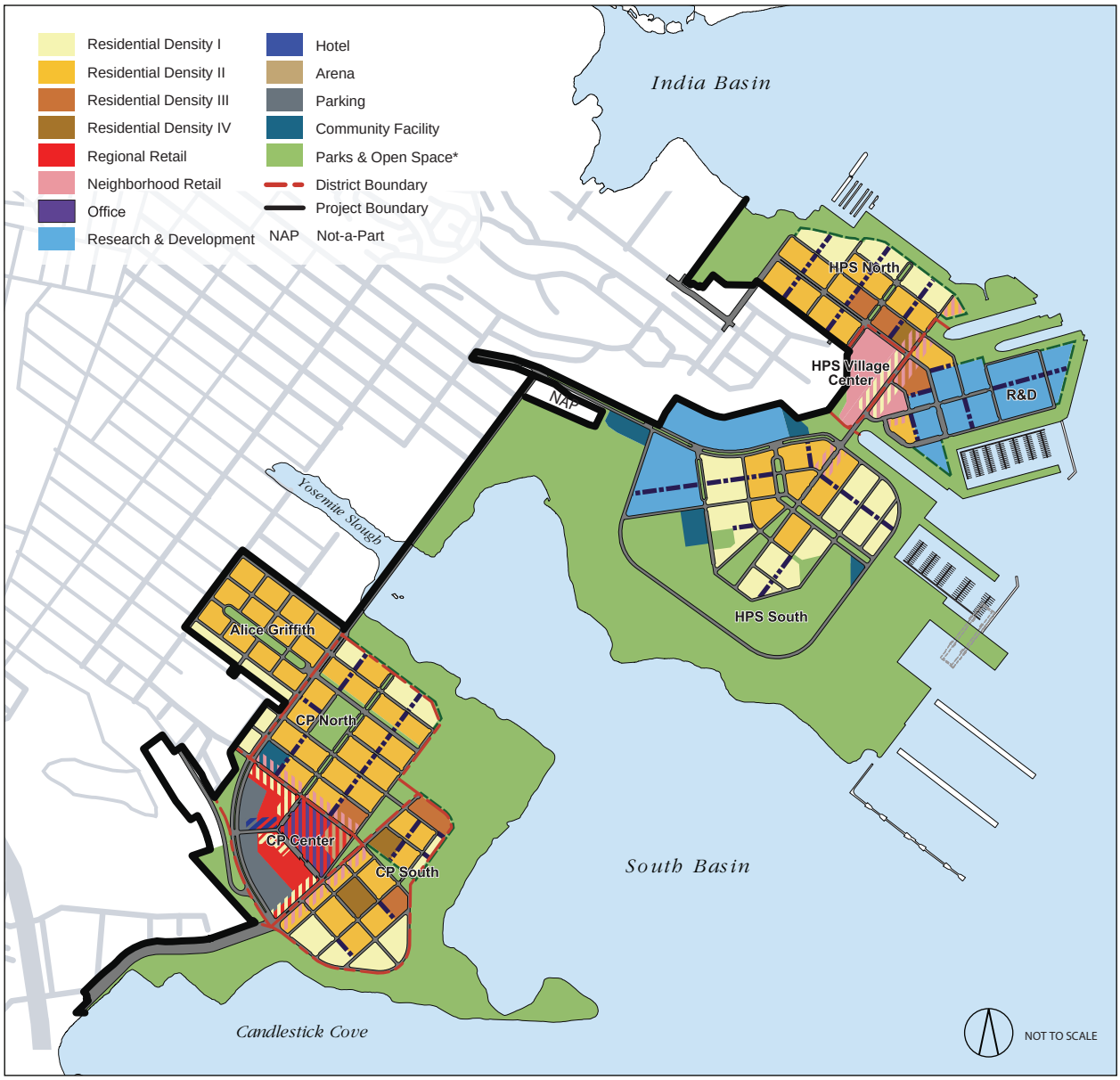
a. The number of residential units in each district may be adjusted depending on market demand; however, the total of housing units for Candlestick Park would not exceed 6,225 units and the total number of housing units for HPS Phase II would not exceed 4,275 units.

b. 1,625 units less than the Project (moved to HPS Phase II).

c. 1,625 units more than the Project (moved from Candlestick Point).

d. Community facilities parcels are intended to provide the existing BVHP community and the future Project community with dedicated land for uses designed to provide, preserve, and leverage such critical local resources as social services, education, the arts, other community services (including public safety facilities such as fire and police stations), and facilities for the benefit of senior citizens. Additional uses proposed for the community facilities parcels such as retail, services, offices, and R&D space, beyond the 100,000 proposed for community facilities, would be absorbed within the retail or R&D program proposed in HPS Phase II. Total uses would not exceed those amounts identified in this table.

e. Residential parking at HPS Phase II would be increased compared to the Project to provide parking for the additional residential units and R&D.



SOURCE: Lennar Urban, 2010.

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FIGURE IV-7a

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING/R&D VARIANT (VARIANT 2A) LAND USE PLAN

There would be no new significant environmental impacts or an increase in the severity of impacts compared to the impacts analyzed for the Project, R&D Variant (Variant 1), or the Housing Variant (Variant 2) as a result of the modification presented by the Housing/R&D Variant (Variant 2A). An environmental analysis of these modifications, with associated illustrative graphics, is contained in this section.

IV.Ca.2 Project Objectives

The objectives for the Housing/R&D Variant (Variant 2A) would be the same as for the Project. A full list of Project objectives is provided in Section II.D of this EIR. In particular, the Housing/R&D Variant (Variant 2A) was prepared to address the following portion of Objective 1:

- Implement the CP-HPS Development Plan with public benefits, whether or not the 49ers decide to remain in San Francisco, including developing alternate uses for the stadium site on the Shipyard Property that are consistent with the overall CP-HPS Development Plan objectives.

IV.Ca.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While many of these components of the Project would also apply to this variant, the discussion below outlines the principal differences.

Land Use Plan

The land use program outlined in Chapter II (Project Description) for Candlestick Point would generally be the same for this Housing/R&D Variant (Variant 2A) as for the Project, with the exception that 1,625 residential units that would have been constructed on Candlestick Point would be relocated to HPS Phase II. The total number of residential units to be developed would remain the same at 10,500. The discussion below is focused on the changes that would occur at HPS Phase II, relative to the Project, the R&D Variant (Variant 1), and the Housing Variant (Variant 2).

The changes proposed with the Housing/R&D Variant (Variant 2A) compared to the Project include residential, R&D, and neighborhood commercial land uses for the HPS South district and the same small reductions in neighborhood commercial uses in other HPS Phase II districts as noted for the Housing Variant (Variant 2). One thousand, six hundred and twenty-five residential units would be relocated to HPS Phase II from Candlestick Point compared to the Project, but the overall total number of residential units would remain the same (i.e., 10,500) as under the Project. The Housing/R&D Variant (Variant 2A) would include 3,000,000 sf of R&D, which is 500,000 sf more when compared to the Project and the Housing Variant (Variant 2) and 2,000,000 sf less than under the R&D Variant (Variant 1). All other land uses within the HPS Phase II districts would be the same as the Project, as described in detail in Chapter II (Project Description). A summary of the development in HPS Phase II proposed with the Housing/R&D Variant (Variant 2A) is provided in Table IV-20a (Housing/R&D Variant [Variant 2A] HPS Phase II Land Use Summary). Figure IV-8a (Housing/R&D Variant [Variant 2A] Maximum Building Heights) illustrates the maximum building heights for Variant 2A.

Table IV-20a Housing/R&D Variant [Variant 2A] HPS Phase II Land Use Summary

District	*Net Acres*[a]	*Dwelling Units*[b,c]	*Density*	*Neighborhood Retail (gsf)*	*Artist Space (gsf)*	*R&D (gsf)*	*Community Services (gsf)*	*Total Commercial (gsf)*
Hunters Point Shipyard North	26.88	2,090	I, II, III, IV	18,000[d]	0	0	0	18,000
Hunters Point Shipyard Village Center	7.69	125	I, II, III	20,000[e]	255,000	0	0	275,000
Research & Development	26.75	435	II, III	62,000[f]	0	2,000,000	0	2,062,000
Hunters Point Shipyard South	61.24[g]	1,625[h]	I, II	25,000[i]	0	1,000,000	50,000	1,075,000
Total	***122.56***	***4,275[h]***	***N/A***	***125,000***	***255,000***	***3,000,000***	***50,000***	***3,430,000***

SOURCE: Lennar Urban, 2009.

a. Net Acreage excludes the street network.

b. 1,320 Residential Density Range I (15 to 75 units per net acre)
2,185 Residential Density Range II (50 to 125 units per net acre)
460 Residential Density Range III (100 to 175 units per net acre)
310 Residential Density Range IV (175 to 270 units per net acre)
4,275 Total units

c. The number of residential units in each district may be adjusted depending on market demand; however, the total of housing units for HPS Phase II would not exceed 4,275 units.

d. 7,000 gsf less than the Project.

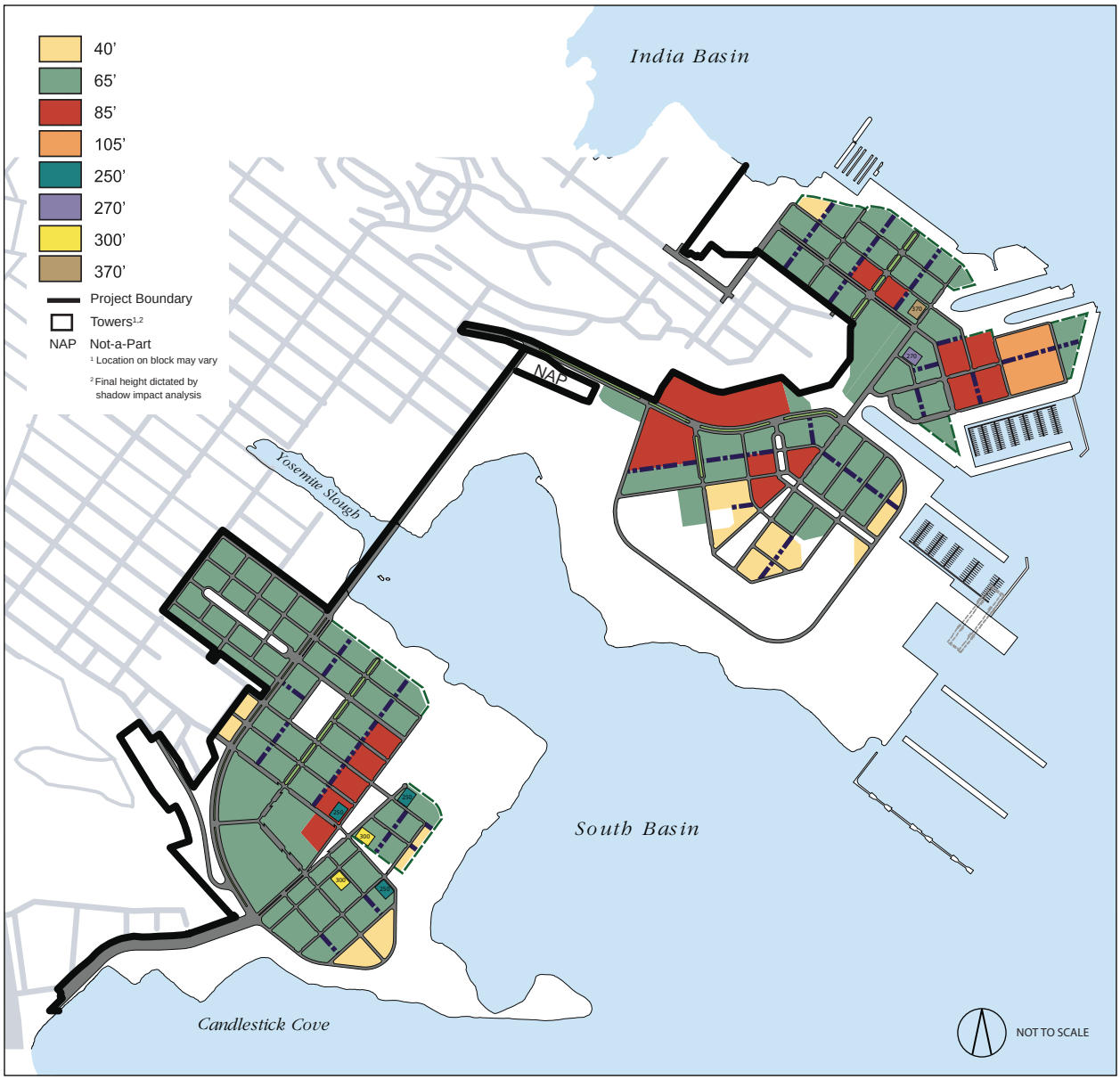
e. 5,000 gsf less than the Project.

f. 13,000 gsf less than the Project.

g. The net acreage of the HPS South district would be increased compared to the Project (32.26 acres with stadium).

h. 1,625 units more than the Project.

i. 25,000 more than the Project.



SOURCE: Lennar Urban, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-8a

HOUSING/R&D VARIANT (VARIANT 2A)
MAXIMUM BUILDING HEIGHTS

With the Housing/R&D Variant (Variant 2A), the 69,000-seat NFL stadium proposed with the Project would not be constructed in the HPS South district. Instead, the Housing/R&D Variant would result in construction of 1,625 dwelling units at Density Ranges I and II and 1,000,000 sf of R&D in the HPS South district. The Project includes no residential or R&D in this district. In addition, with the Housing/R&D Variant, the HPS South district would develop 25,000 gsf of neighborhood retail, while the Project would not develop any neighborhood retail adjacent to the stadium.

Parks and Open Space at HPS Phase II

The Housing/R&D Variant (Variant 2A) parks and open space on Candlestick Point would be the same as for the Project; this discussion focuses on HPS Phase II changes. The Housing/R&D Variant (Variant 2A) would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. As presented in Table IV-21a (Housing/R&D Variant [Variant 2A] HPS Phase II Parks and Open Space), HPS Phase II would have 221.8 acres of parks and open space compared to the 230 acres on HPS Phase II under the Project. The Sports Field Complex proposed with the Housing/R&D Variant (Variant 2A) would be 39 acres, which is approximately 20 acres less than proposed with the Project. The 2.0-acre Hunters Point South Park, 0.7-acre Hunters Point Mini Park, 0.9-acre Hunters Point Neighborhood Park, and 3.1-acre Hunters Point Wedge Park would be constructed in the HPS South district, which is not included in the Project. Table IV-21a presents the proposed park and open space at HPS Phase II in the Housing/R&D Variant (Variant 2A).

Table IV-21a Housing/R&D Variant (Variant 2A) HPS Phase II Parks and Open Space

Park/Open Space		*Acres*
New Parks		
Northside Park		12.8
Waterfront Promenade		32.4
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		45.2
Grasslands Ecology Park at Parcel E-2		38.2
Hunters Point Wedge Park		3.1
Hunters Point South Park		2.0
Hunters Point Neighborhood Park		0.9
Hunters Point Mini Park		0.7
	Subtotal	*150.9*
New Sports Fields and Active Urban Recreation		
Sports Field Complex		39.0
Multi-Use Lawn		25.2
Waterfront Recreation & Event Pier		6.7
	Subtotal	*70.9*
	Total	***221.8***

SOURCE: Lennar Urban 2010.

Figure IV-9a (Housing/R&D Variant [Variant 2A] Parks and Open Space) illustrates the location of the proposed parks and open space. Figure IV-10a (Housing/R&D Variant [Variant 2A] Building and Park

Construction Schedule) provides phasing and construction information for development of the buildings and parks under Variant 2A.

■ Transportation and Circulation

The transportation and circulation plan under the Housing/R&D Variant (Variant 2A) would be the same as proposed for the Housing Variant (Variant 2).

■ Infrastructure

The location of major infrastructure improvements under the Housing/R&D Variant (Variant 2A) would be the same as that proposed for the Housing Variant (Variant 2).

■ Implementation

Build-out of the housing and R&D uses at HPS Phase II would begin in the first phase of development and would be completed by 2027. Figure IV-10a illustrates the overall sequence of development for the Housing/R&D Variant (Variant 2A).

IV.Ca.4 Potential Environmental Effects

■ Analytic Method

The Housing/R&D Variant (Variant 2A) represents a modification of the Housing Variant (Variant 2) and also includes components of the R&D Variant (Variant 1). The R&D Variant (Variant 1) analyzes 5,000,000 sf of R&D on the stadium site and the Housing/R&D Variant (Variant 2A) contemplates 3,000,000 sf of R&D on the stadium site. The Housing Variant (Variant 2) proposes relocating 1,350 residential units to HPS Phase II, and the Housing/R&D Variant (Variant 2A) contemplates relocating 1,625 residential units to HPS Phase II.

For environmental resources that are dependent on types of land uses, rather than size, (Land Use and Plans, Hazards and Hazardous Materials, and, to some extent, Utilities and Energy) it would be appropriate to compare the impacts of the Housing/R&D Variant (Variant 2A) to those impacts analyzed for the R&D Variant (Variant 1) and/or the Housing Variant (Variant 2) to demonstrate that the impacts from the Housing/R&D Variant (Variant 2A) are "bracketed" within the range of impacts already analyzed.

SOURCE: Lennar Urban, RHAA, 2010.

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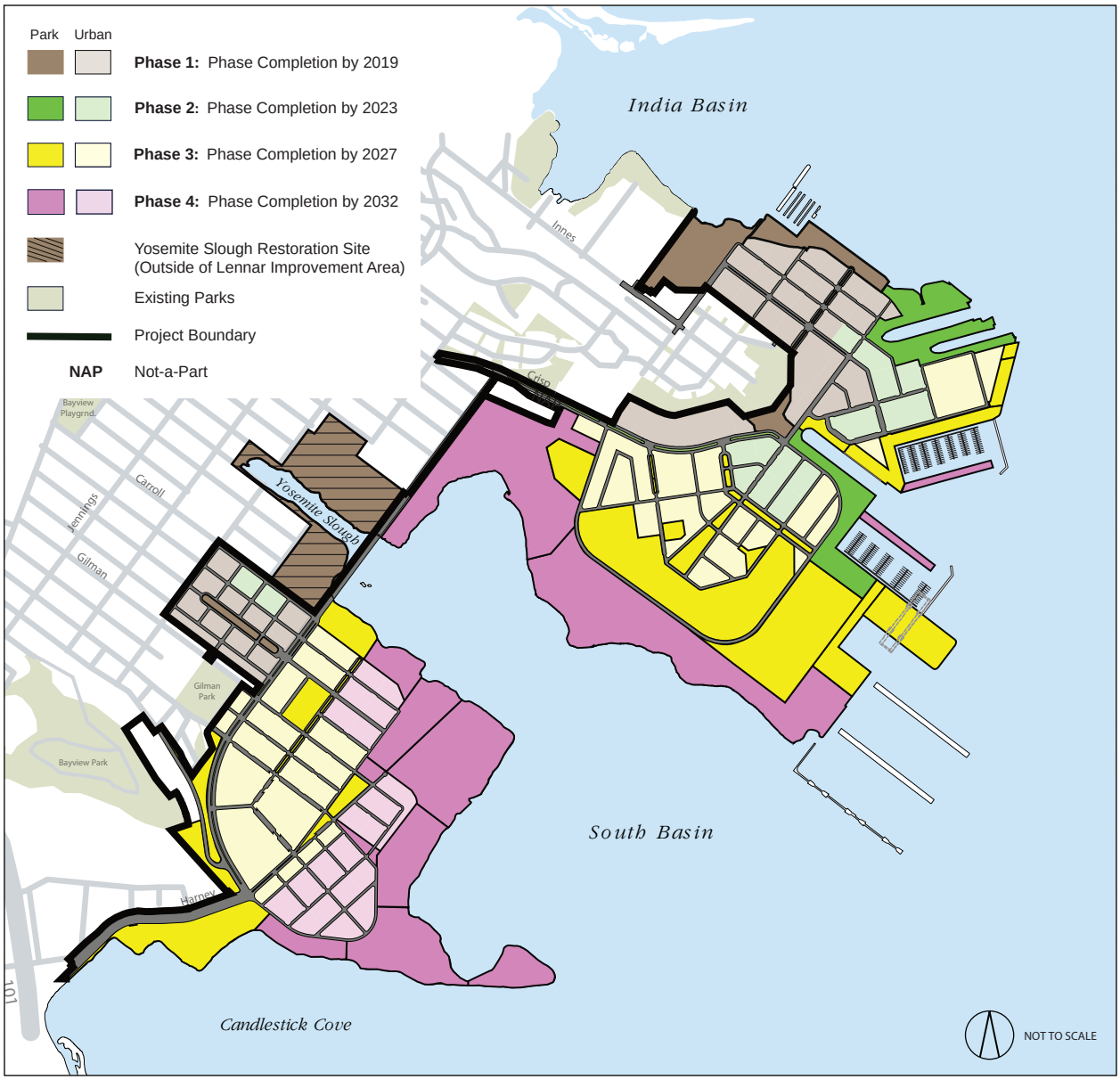
HOUSING/R&D VARIANT (VARIANT 2A) PARKS AND OPEN SPACE

FIGURE IV-9a



SOURCE: Lennar Urban, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-10a

HOUSING/R&D VARIANT (VARIANT 2A)
BUILDING AND PARK CONSTRUCTION SCHEDULE

The footprint of development for Variant 2A is approximately the same as that of the R&D Variant (Variant 1) but slightly less than that of the Project.[1263] The Housing/R&D Variant (Variant 2A) would result in a total of 46.8 percent area of impervious surface (an indicator of development footprint) on HPS; the Project would result in total impervious surface area on HPS of 48.4 percent; and the R&D Variant (Variant 1) would have total impervious surface area on HPS of 46.7 percent. For environmental resources whose impacts depend on the extent or intensity of development and extent of ground disturbance (Cultural/Paleontological Resources, Hazards and Hazardous Materials, Geology and Soils, Hydrology and Water Quality), it would be appropriate to compare the impacts of the Housing/R&D Variant (Variant 2A) to the Project, as the Project's development "footprint" is slightly greater than the footprint of the Housing/R&D Variant (Variant 2A). The location of development would remain the same under the Housing/R&D Variant (Variant 2A) and the impact conclusions made for the Project that also depend on the specific location of development (Biological Resources and Cultural/Paleontological Resources) would also apply to Variant 2A. Thus, the impacts of the Housing/R&D Variant (Variant 2A) have been bracketed by the impacts analyzed for the Project with respect to Cultural Resources and Paleontological Resources, Hazards and Hazardous Materials, Geology and Soils, Hydrology and Water Quality, and Biological Resources. Impacts of the Housing/R&D Variant (Variant 2A) that are dependent on intensity of development or extent of land disturbance would be substantially the same as the impacts for the development proposed for the Project.

With respect to Wind and Shadow impacts, which are dependent on the heights and massing of structures, building heights and massing for the Housing/R&D Variant (Variant 2A) would be substantially similar to the Project, and within the height limits established by the Project districts. Therefore, the impacts of the Housing/R&D Variant (Variant 2A) for these topics would be appropriately compared to the impacts of the Project.

For Transportation and Circulation, Aesthetics, Air Quality, Noise, Recreation, and Greenhouse Gas Emissions, the combination of housing and R&D on the stadium site and development schedule modifications require a somewhat more comprehensive analysis to determine the impacts of the Housing/R&D Variant (Variant 2A) compared to the Project, the R&D Variant (Variant 1), or the Housing Variant (Variant 2).

Therefore, the impacts of the Housing/R&D Variant (Variant 2A) are analyzed in the following sections compared to the impacts of the Project, Variant 1, and/or Variant 2, whichever is the most appropriate for the particular resource, to demonstrate that the impacts of Variant 2A would be bracketed by one or more of the analyses previously provided in the EIR.

Construction Impacts

Potential construction-related environmental effects of the Housing/R&D Variant (Variant 2A) would be approximately the same as those analyzed for the R&D Variant (Variant 1), as it would include approximately the same intensity of development. Therefore, all construction-related environmental effects of the Housing/R&D Variant (Variant 2A) are the same as contained in the analysis of the R&D Variant on pages IV-14 through IV-73 of the EIR.

[1263] IBI Group, April 8, 2010.

Depending on the phasing of the additional development, the Housing/R&D Variant (Variant 2A) may result in fewer construction traffic impacts between future years 2012 and 2017, when the new stadium would be constructed, and somewhat greater impacts in the years the housing and additional R&D would be constructed. Implementation of a Construction Traffic Management Program (the same as described for the Project in mitigation measure MM TR-1) would help minimize the Housing/R&D Variant's contribution to cumulative construction-related traffic impacts. However, localized construction-related traffic impacts would remain significant and unavoidable, similar to the Project, and would be bracketed by the analysis for the Project.

With regard to air quality, construction activities would occur over the same construction period and would be essentially the same as those identified for the Project and the R&D Variant (Variant 1). Any project within the City of San Francisco, including the Housing/R&D Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). Implementation of mitigation measure MM HZ-15, which identifies specific mitigation that would be used to reduce emissions associated with construction. As the development footprint of the Housing/R&D Variant (Variant 2A) would be substantially similar to and have been "bracketed by" the analyses for the Project and the R&D Variant (Variant 1), impacts would be less than significant as previously identified in the analyses of construction air quality impacts for the Project and the R&D Variant (Variant 1), and would be bracketed by the impact analysis for the Project and the R&D Variant (Variant 1).

With respect to airborne human health risks, construction measures MM AQ-2.1 and MM AQ-2.2 would be implemented for the Housing/R&D Variant (Variant 2A), reducing diesel particulate matter (DPM) and dust or particular matter (PM_{10}) to less than significant. As construction emissions associated with the Housing/R&D Variant (Variant 2A) are expected to be lower than those associated with construction of a stadium in the same location (e.g., Project), the Housing/R&D Variant (Variant 2A) would have reduced impacts compared to the Project. Refer to Appendix T4 (ENVIRON, Updated Air Quality Analysis Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Updated Variants 2A and 3 [Tower Variant D], Alternative 2, and Subalternative 4A, April 26, 2010). The Health Risk Assessment (HRA) performed for the Project (Appendix H3 to the EIR) concluded that the inhalation cancer risk at the Maximum Extent of Impact (MEI) for the Project would be 4.5 in one million. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the BAAQMD threshold. The Housing/R&D Variant (Variant 2A) is not anticipated to exceed Project impacts and, therefore, would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.01, which is below the BAAQMD's HI significance threshold of 1.0. Therefore, this impact would be bracketed by the impact analyzed in the Project, and would similarly be less than significant.

The HRA for the Project analyzed the potential for construction activities to generate toxic air contaminants (TACs) associated with soil-PM_{10} and evaluated the potential concentrations of airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult

and child residents, workers, and schoolchildren) in the Project vicinity. The inhalation cancer risk at the point of maximum impact or MEI as a result of construction activities at the Project site would be 0.04 in one million and would not exceed the BAAQMD threshold, similar to the Project. In addition, the HRA concluded the maximum non-cancer HI to be 0.03, which would be below the BAAQMD's significance threshold of 1.0. The impacts of the Housing/R&D Variant (Variant 2A) would be bracketed by the analysis for the Project.

All construction-related mitigation measures outlined for the Project would also apply to the Housing/R&D Variant (Variant 2). These include: MM TR-1, MM AE-2, MM AQ-2.1, MM AQ-2.2, MM NO-1a.1, MM NO-1a.2, MM NO-2a, MM CP-1b.1, MM CP-2a, MM CP-3a, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM GE-2a, MM GE-3, MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, MM GE-5a, MM GE-6a, MM GE-10a, MM GE-11a, MM HY-1a.1, MM HY-1a.2, MM HY-1a.3, MM HY-6a.1, MM HY-12a.1, MM HY-12a.2, MM HY-14, MM BI-4a.1, MM BI-4a.2, MM BI-5b.1, MM BI-5b.3, MM BI-5b.4, MM BI-6a.1, MM BI-6a.2, MM BI-6b, MM BI-9b, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, MM BI-12b.2, MM BI-14a, MM PS-1, MM UT-3a, and MM UT-5a. (Refer to Table ES-2.)

■ Operational Impacts

Land Use and Plans

The Housing/R&D Variant (Variant 2A) would develop 3,000,000 sf of R&D on the HPS Phase II site, which is 2,000,000 less square footage than the R&D Variant (Variant 1). However, 1,625 additional housing units and 500,000 additional sf of R&D compared to the R&D Variant (Variant 1) would be constructed on HPS Phase II on the stadium site. The impacts of the types of land uses proposed for the stadium site under the Housing/R&D Variant (Variant 2A) have been analyzed in both the R&D and Housing Variant analyses contained on pages IV-12 through IV-139 of the Draft EIR.

The Housing/R&D Variant (Variant 2A) would not introduce any new land uses that were not analyzed in the R&D and Housing Variants. The residential units and R&D would be located on the stadium site, the same as for the R&D and Housing Variants, and would not divide an established community. The Housing/R&D Variant (Variant 2A) would not conflict with any policies of applicable land use plans or result in urban decay, as analyzed for the R&D and Housing Variants, as the proposed uses and densities are within the range of development analyzed for the R&D and Housing Variants. The impacts would be less than significant, similar to the R&D and Housing Variants.

Population, Housing, and Employment

The Housing/R&D Variant (Variant 2A) would result in construction of the same number of dwelling units as the Project (10,500), with the same resulting resident population increase. The Housing/R&D Variant (Variant 2A) would generate 11,629 jobs,[1264] less than the 16,635 jobs estimated for the R&D Variant (Variant 1), but more than for the Project. Therefore, impacts related to population, housing, and employment would be bracketed by the analysis for the Project and Variant 1, and would be similarly less than significant.

[1264] Utilizing generation factor of one job for every 4,000 sf.

Transportation and Circulation

Overall, the Housing/R&D Variant (Variant 2A) would not increase the total amount of residential development compared to the Project, but would relocate approximately 1,625 housing units from Candlestick Point to HPS Phase II, and would add 500,000 gsf of R&D to HPS Phase II. Therefore, 4,275 residential units (rather than 2,650 residential units as under the Project) and 3,000,000 gsf (rather than 2,500,000 gsf as under the Project) of R&D would be developed at HPS Phase II. The Housing/R&D Variant (Variant 2A) would include all uses proposed with the Project with the exception of the stadium, which would be replaced by the relocated housing units and additional R&D. There would be no football stadium. Therefore, the Housing/R&D Variant (Variant 2A) would not have game day or other stadium event transportation impacts associated with the Project. The Housing/R&D Variant (Variant 2A) would have the same roadway, transit, bikeway, and Bay Trail improvements proposed with the Project, including the Yosemite Slough bridge. However, as with all non-stadium variants, the bridge would be narrower than the bridge with the Project, with a 41-foot-wide right-of-way to accommodate two BRT lanes, a sidewalk, and a Class I bicycle path.

As with the Project, the Housing/R&D Variant (Variant 2A) would implement a Transportation Demand Management plan as described in Project mitigation measure MM TR-2 and a Transit Operating Plan as described in Project mitigation measure MM TR-17.

A transportation analysis was conducted for the Housing/R&D Variant (Variant 2A) and key conclusions are presented below. The analysis is provided as Appendix T6 (LCW Consulting, CP-HPS Phase II Development Plan Transportation Study—Project Variant 2A, March 15, 2010) to this document.

Trip Generation

The Housing/R&D Variant (Variant 2A) would have 220,323 total daily person trips, slightly more than the trips generated with the Project (219,651), but less than the R&D Variant (236,291). Similarly, the Housing/R&D Variant (Variant 2A) would generate slightly more peak hour person trips during both the AM and PM peak hours (14,042 weekday AM trips, 20,727 weekday PM trips, and 18,240 Sunday PM trips) than the Project (13,558 weekday AM trips, 20,412 weekday PM trips, and 18,128 Sunday PM trips), but fewer peak hour trips than the R&D Variant (16,253 weekday AM trips, 22,586 weekday PM trips, and 19,719 Sunday PM trips). Thus, the impacts from the Housing/R&D Variant (Variant 2A with respect to trip generation have been bracketed by the analysis for the Project and the R&D Variant (Variant 1).

Intersection LOS

There are three intersections—Cesar Chavez/Evans, Crisp/Palou, and Bayshore/Oakdale—where the Housing/R&D Variant (Variant 2A) would result in a greater impact than as identified for the Project. The intersections of Crisp/Palou and Bayshore/Oakdale would have a project-level significant impact that does not occur under the Project. At these same two intersections, however, the R&D Variant (Variant 1) was identified to have a significant and unavoidable impact, with greater levels of delay (although same level of service) when compared to the Housing/R&D Variant (Variant 2A). Therefore, for these two intersections, the impacts have been bracketed by the analysis for the Project and for the R&D Variant (Variant 1).

For the intersection of Cesar Chavez/Evans, the Housing/R&D Variant (Variant 2A) would make a significant contribution to cumulative impacts as well as a project-level significant impact compared to the no significant contribution and no significant project-level impact under the Project. For the same intersection, the analysis for the R&D Variant (Variant 1) concluded that there would be a significant contribution and a significant project-level impact, and the contribution from the R&D Variant (Variant 1) would be greater for the R&D Variant (Variant 1) than for the Housing/R&D Variant (Variant 2A). The average delay at this intersection would be less under the Housing/R&D Variant (Variant 2A) than under the R&D Variant (Variant 1). Therefore, for this intersection, the impacts have been bracketed by the analysis for the Project and the R&D Variant (Variant 1).

Freeway Conditions

The Housing/R&D Variant (Variant 2A) would generate more trips than the Project but fewer than the R&D Variant (Variant 1), as noted, above. The Housing/R&D Variant (Variant 2A) effects on freeway mainline sections and freeway ramp junctions would be greater compared to the Project, but less than with the R&D Variant (Variant 1). The Housing/R&D Variant (Variant 2A) ramp queuing effects would be similar to Project effects. The Housing/R&D Variant (Variant 2A) would result in significant impacts with respect to ramp queuing at the same off-ramp locations as the Project, with one exception. With the Housing/R&D Variant (Variant 2A), the US-101 northbound off-ramp to Harney Way would not be likely to experience queues extending back to the mainline in the PM peak hour. However, the Housing/R&D Variant's contribution to other off-ramps expected to experience significant traffic impacts associated with queuing under Project conditions would be the same as the Project. As described for Project impacts, no feasible mitigation measures have been identified for the freeway off-ramps expected to experience significant impacts. Impacts of the Housing/R&D Variant (Variant 2A) on freeway conditions would be significant and unavoidable, the same as for the Project and the R&D Variant (Variant 1), except for the one off-ramp location noted where the impact of the Housing/R&D Variant (Variant 2A would be less than significant, compared to the significant and unavoidable impact on this off-ramp under both the Project and the R&D Variant (Variant 1). Thus, the impacts of the Housing/R&D Variant (Variant 2A) with respect to freeway conditions would be bracketed by the impact analysis for the Project and the R&D Variant (Variant 1) as contained in the EIR.

Transit Impacts

The Housing/R&D Variant (Variant 2A), as with the Project, would include extended and new transit services; transit trips with the Housing/R&D Variant (Variant 2A) would be accommodated within the capacity of these services. The Housing/R&D Variant (Variant 2A), as with the Project, would have a less-than-significant impact with mitigation (i.e., implementation of MM TR-27—the Transit Operating Plan) on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with the Housing/R&D Variant (Variant 2A) would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. Project mitigation measures MM TR-21 to MM TR-30 would also apply to the Housing/R&D Variant (Variant 2A), but, as concluded in Section III.D of the EIR, the feasibility or implementation of the measures is uncertain, and the transit delay effects would remain significant and unavoidable. The Housing/R&D Variant (Variant 2A) would require a similar number of additional vehicles on the same routes as the Project to mitigate transit congestion delays. Impacts associated with

the Housing/R&D Variant (Variant 2A) would be more extensive than those for the Project and the Housing Variant (Variant 2), but less than the R&D Variant (Variant 1), and would be significant and unavoidable.

Bicycle Impacts

The Housing/R&D Variant (Variant 2A) bicycle trips would be accommodated within the proposed street and network, and impacts on bicycle circulation would be less than significant.

As with the Project, potential significant impacts on bicycle travel on Palou Avenue would occur under Housing/R&D Variant. Project mitigation measure MM TR-32 would reduce impacts on bicyclists; however, because a feasibility study would be required, the implementation of Project mitigation measure MM TR-32 is uncertain, and, therefore, the Housing/R&D Variant (Variant 2A) impacts on bicycle circulation would remain significant and unavoidable, the same as for the Project.

Pedestrian Impacts

The Housing/R&D Variant (Variant 2A) would be accommodated within the proposed sidewalk and pedestrian network, and impacts on pedestrian circulation would be less than significant.

Parking Impacts

The Housing/R&D Variant (Variant 2A) would result in a demand for about 21,776 spaces, compared with a maximum permitted supply of about 17,274 spaces; therefore, the maximum off-street parking supply would be about 4,502 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. Due to parking supply constraints and accessibility to transit, future Housing/R&D Variant (Variant 2A) parking demand may be somewhat lower than estimated, and, therefore, the parking space shortfall would also be less than the number of spaces that would be required in order to accommodate all the vehicles anticipated if the proposed parking supply were unconstrained. Since the parking supply would be constrained, the actual parking demand would be expected to be less. As discussed in Section III.D, peak parking demand would not occur simultaneously; public parking facilities, such as the one proposed in Candlestick Point, and on-street parking spaces can usually be shared efficiently among many destinations, and the Housing/R&D Variant (Variant 2A) would include a Travel Demand Management program that includes a number of parking strategies to make auto use and ownership less attractive, as well as strategies to encourage alternative modes.

As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers who are aware of constrained parking conditions in a given area shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall

in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Housing/R&D Variant (Variant 2A) impacts on parking would be less than significant.

The Housing/R&D Variant (Variant 2A) would have less-than-significant effects on other transportation conditions (loading, air traffic, and emergency access).

Arena Impacts

As with the R&D Variant (Variant 1), since the amount of background transit demand under the Housing/R&D Variant (Variant 2A) would be higher than the Project, it is possible that the added transit demand associated with a sold-out arena event would create demand for transit service greater than the capacity of the transit supply to the arena. Project mitigation measure MM TR-51 (Transportation Management Plan for the arena) and MM TR-23.1 (Maintain the proposed headways of the 29-Sunset) would apply to the Housing/R&D Variant (Variant 2A) and would help minimize the impacts. This mitigation requires that SFMTA increase frequency on regularly scheduled Muni routes (primarily the CPX-Candlestick Express) serving the arena area prior to large events at the arena and convert one of the two automobile travel lanes in each direction into a transit-only travel lane on Gilman Avenue between Arelious Walker Drive and Third Street. Additionally, westbound Paul Avenue, between Third Street and Bayshore Boulevard, provides one westbound travel lane and on-street parking. Additional shuttle service to key regional transit destinations, such as BART, Caltrain, and the T-Third light rail route would also be provided by the arena operator. With implementation of the mitigation measure, the Housing/R&D Variant's impacts to transit service would be reduced, but not to less-than-significant levels. In addition, traffic impacts during events at the arena would not be mitigated, and would impact transit operations. Because transit demand would be greater under the Housing/R&D Variant (Variant 2A) compared to the Project and less than the demand under the R&D Variant (Variant 1), the impacts of the Housing/R&D Variant (Variant 2A) have been bracketed in the analysis contained in the EIR for the Project and the R&D Variant (Variant 1).

Aesthetics

Compared to the R&D Variant (Variant 1) and Housing Variant (Variant 2), building heights and massing would appear substantially similar to what was analyzed for those variants. All other urban design and building forms with the Housing/R&D Variant, and resulting effects, would be similar to conditions with the R&D and Housing Variants. Building heights and massing would remain within the parameters analyzed for the R&D and Housing Variants. Building heights would be maintained within the height limits established for the Project districts (refer to Figure IV-8a). There would be new development along the south side of Crisp, which would not occur under the Project, Variant 1, or Variant 2. However, as illustrated in Figure IV-7a and Figure IV-8a, the structures proposed south of Crisp under Variant 2A would not exceed 85 feet in height or be taller than proposed buildings farther east. The area where additional structures (compared to the Project) would be constructed would be limited to a small portion of the site.

The Housing/R&D Variant (Variant 2A) would not introduce new land uses or types of structures that were not previously considered and analyzed with respect to effects on scenic resources. Similarly, as the Housing/R&D Variant (Variant 2A) would develop the same mix of uses on the same site, the impacts to

visual character or quality would be the same as analyzed for the Project, the R&D Variant (Variant 1), and the Housing Variant (Variant 2).

Figure IV-10b through Figure IV-10d provide visual simulations of the general appearance, height, bulk, and location of structures proposed under Variant 2A. Figure III.E-10 (Viewpoint Locations) also identifies Views 16a and 18a. As can be seen, the overall appearance of Variant 2A would be substantially similar to the Project and the other variants. No long- or mid-range views would be blocked and no scenic resources would be affected, similar to the Project and the other variants. As the amount of development would be within the development envelope analyzed for the Project, Variant 1, and Variant 2, and with implementation of the same mitigation measures identified for the Project, impacts from light and glare would be less than significant.

Therefore, the impacts on scenic vistas, scenic resources, visual character, and from light and glare would be less than significant, similar to the Project, the R&D Variant (Variant 1), and the Housing Variant (Variant 2).

Shadow

The buildings proposed under the Housing/R&D Variant (Variant 2A) on the stadium site would be lower in height than those analyzed for the Project; none of the buildings proposed on the stadium site would be greater than the 156-foot height of the proposed stadium as analyzed for the Project. Therefore, shadow impacts of the Housing/R&D Variant (Variant 2A) would be less than the Project and less than significant.

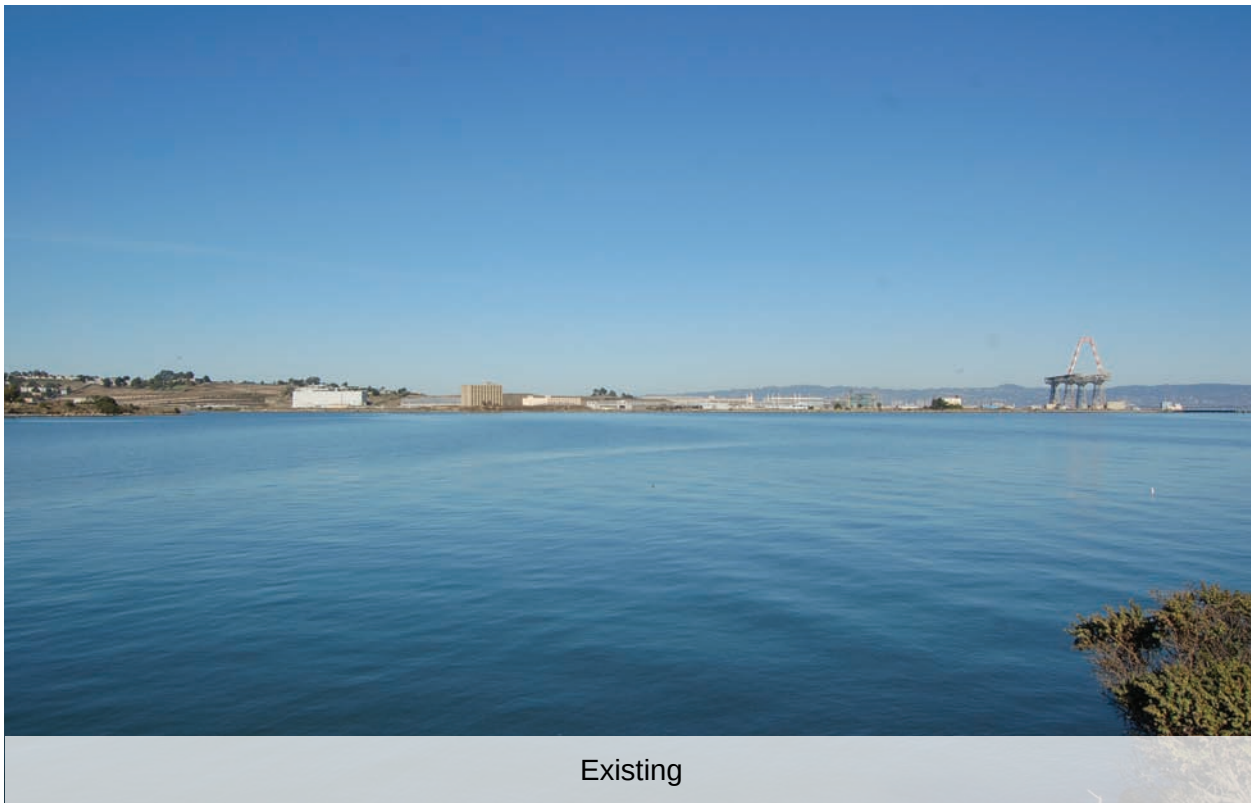
Wind

Maximum building heights would be subject to the same height limitations as the Project. Heights of the R&D and residential structures would be less than the 156-foot height of the stadium structure, and there would be no new structures of 100 feet or greater. The impacts would be less than significant, similar to the Project.

Air Quality

Other than the stadium site and removal of housing units in the Jamestown District on Candlestick Point, land uses provided with the Housing/R&D Variant (Variant 2A) would be the same as the Project. The additional R&D and housing on the stadium site were evaluated considering the 350-foot restriction (buffer) required by the HPS Redevelopment Plan.[1265] The Housing/R&D Variant (Variant 2A) was also evaluated to update the traffic $PM_{2.5}$ and cumulative analyses presented in the technical memoranda prepared by ENVIRON as Appendix H4 (Community Hazards and San Francisco Health Code Article 38 Analyses Candlestick Point–Hunters Point Shipyard Phase II Redevelopment Project, May 2010) and as Appendix T4 ENVIRON, Updated Air Quality Analysis Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Updated Variants 2A and 3 [Tower Variant D], Alternative 2, and Subalternative 4A, April 26, 2010).

[1265] The HPS Redevelopment Plan states, "No Laboratory, Life Sciences, Light Industrial, and/or Green Technology uses containing a facility that emits regulated toxic air contaminants shall be permitted within 350 feet of any residential use south of Crisp Road in Hunters Point South."



Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.11.10 02056 | JCS | 10

FIGURE IV-10b

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING/R&D VARIANT (VARIANT 2A)
VIEW 17: NORTHEAST FROM CPSRA

Existing

Proposed

SOURCE: Lennar Urban, 2010.

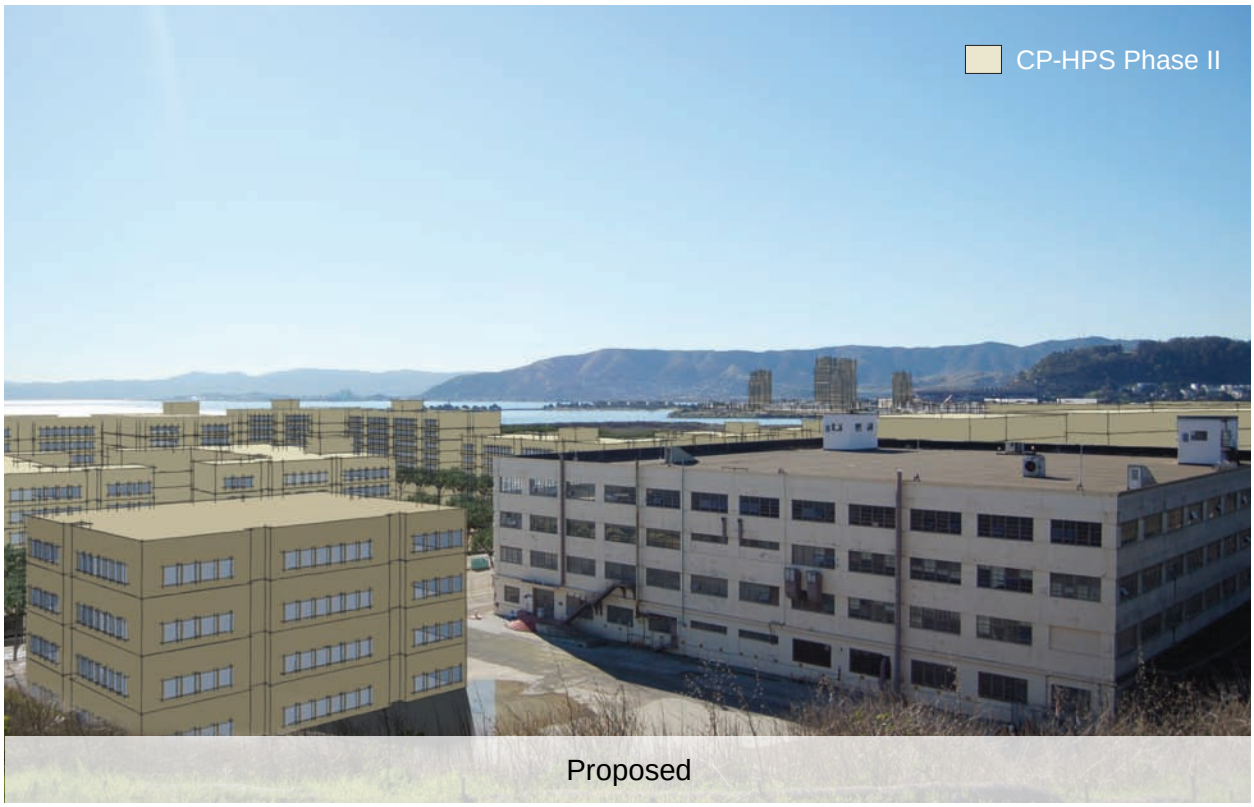
PBS&J 04.11.10 02056 | JCS | 10

FIGURE IV-10c

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING/R&D VARIANT (VARIANT 2A)
VIEW 18: SOUTH FROM HILLTOP OPEN SPACE

Existing



Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.11.10 02056 | JCS | 10

FIGURE IV-10d

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING/R&D VARIANT (VARIANT 2A)
VIEW 16a: SOUTHWEST FROM CRISP ROAD

Operational impacts to regional and local air quality would be substantially similar to the Project, less in most respects but slightly greater for PM_{10}. Under the Housing/R&D Variant, the football stadium proposed under the Project would be replaced with 1,625 residential units redistributed from Candlestick Point to HPS Phase II as well as 500,000 sf of R&D. Due to the redistribution of uses under this variant, approximately 672 additional vehicle trips over that of the Project would occur and would result in a somewhat higher level of daily VMT than the Project. As such, the level of certain emissions anticipated under the Housing/R&D Variant (Variant 2A) would be slightly greater than the Project. As shown in Table IV-23a (Housing/R&D Variant [Variant 2A] Operational Criteria Pollutant Emissions [Year 2030]), the difference in daily emissions of RO_X, NO_X, CO, and $PM_{2.5}$ would decrease under this variant compared to the Project by 1 to 6 percent, while PM_{10} emissions would increase by 1.6 percent. Compared to the R&D Variant (Variant 1), because Variant 1 would have substantially greater trips and VMT, the Housing/R&D Variant (Variant 2A) emissions would be less than under the R&D Variant (Variant 1) during operation.

All variants and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Housing/R&D Variant (Variant 2A), similar to the Project and the other variants, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. The Housing/R&D Variant's transportation analysis estimates that a similar housing development that did not include the trip reduction features of the Housing/R&D Variant (Variant 2A) would generate 220,323 daily external motor vehicle trips (about 0.6 percent more than the Project, which would generate 219,651 daily trips and 6.8 percent less than the R&D Variant [Variant 1], which would generate 236,291 daily trips). The comparison of the Housing/R&D Variant (Variant 2A) to a similar level of development under "business as usual" conditions shows a 16 to 42 percent reduction in criteria pollutant emissions.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated under the Housing/R&D Variant (Variant 2A) would exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project and the R&D Variant (Variant 1), no additional feasible mitigation measures are available to would reduce the Housing/R&D Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact. It should be noted that, as stated above, although the significance under this variant would be similar to the Project and the R&D Variant (Variant 1), all criteria pollutant emissions, with the exception of PM_{10}, and a slight increase of NO_X associated with the operation of uses under the Housing/R&D Variant (Variant 2A) would be less than the Project, and all criteria pollutant emissions would be less than with the R&D Variant (Variant 1), as stated in Table IV-23a.

With respect to airborne human health risks, emissions associated with operation activities under the Housing/R&D Variant (Variant 2A) would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$). Under the Housing/R&D Variant, dwelling units would be relocated from CP to the HPS Phase II area.

Table IV-23a Housing/R&D Variant (Variant 2A) Operational Criteria Pollutant Emissions (Year 2030)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Hunters Point Shipyard (Variant 2A)					
Area[a]	261	54	38	0	0
Motor Vehicles (External)	107	96	1,062	508	96
Subtotal	*368*	*150*	*1,100*	*508*	*96*
Candlestick Point (Variant 2A)					
Area[a]	358	58	38	0	0
Motor Vehicles (External)	207	188	2,049	1,006	186
Subtotal	*564*	*246*	*2,087*	1,006	*186*
All Sources (Variant 2A)	***932***	***396***	***3,187***	***1,514***	***282***
All Development Sites (Proposed Project)					
Area[a]	616	108	83	5	5
Motor Vehicles (External)	308	278	3,177	1,466	276
Motor Vehicles (Internal)	30	13	229	45	9
All Sources (Proposed Project)	***945***	***394***	***3,406***	***1,490***	***285***
Comparison to Proposed Project	***99%***	***99.5%***	***94%***	***101.6%***	***99%***
Change from Proposed Project	*-1%*	*0.5%*	*-6%*	*1.6%*	*-1%*
All Sources (R&D Variant)	***997***	***442***	***3,793***	***1,650***	***315***
Comparison to Proposed Project	***106%***	***112%***	***111%***	***111%***	***111%***
Change from Proposed Project	*6%*	*12%*	*11%*	*11%*	*11%*
All Development Sites (Business as Usual)					
Area[a]	616	108	83	5	5
Motor Vehicles	485	476	5,292	2,561	481
All Sources (Business as Usual)	***1,101***	***585***	***5,375***	***2,566***	***486***
Comparison to Proposed Project	***116.5%***	***148%***	***158%***	***172%***	***170.5%***
Comparison to R&D Variant	***110%***	***132%***	***142%***	***155%***	***154%***
Comparison to Variant 2A to Business as Usual	***84%***	***67%***	***59%***	***58%***	***59%***
Reduction from Business as Usual	*-16%*	*-33%*	*-41%*	*-42%*	*-41%*

SOURCE: PBS&J, 2010. Based on URBEMIS 2007 Version 9.2.4; model input/output in included in Appendix H1.

Daily emissions of ROG and NO_X were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

The Housing/R&D Variant (Variant 2A) continues to include R&D facilities at HPS Phase II, which are situated partly on the stadium site to the west of the proposed housing on the stadium site and the remainder on a peninsula extending to the east of the proposed additional housing and south of other proposed residential areas. As the predominant winds are out of the west, some on-site receptors would

be downwind from some of these R&D areas, particularly the R&D area on the stadium site. As such, a health risk analysis (HRA) was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas for the Housing/R&D Variant, similar to those discussed for the Project and R&D Variant (Variant 1). Details regarding this assessment can be found in a technical memorandum prepared by ENVIRON on April 26, 2010.[1266]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. The HPS Redevelopment Plan states "no Laboratory, Life Sciences, Light Industrial, and/or Green Technology uses containing a facility that emits regulated toxic air contaminants shall be permitted within 350 feet of any residential use south of Crisp Road in Hunters Point South." Though the Housing/R&D Variant (Variant 2A) has residential areas immediately adjacent to the R&D on the stadium site, with the provision in the HPS Redevelopment Plan, the estimated cancer risks for long-term residential exposure not exceed 10 in one million in the residential areas. The estimated health risks would be above BAAQMD thresholds for all residential receptor locations as a result of implementation of the Variant without the following mitigation measure. Impacts from this Variant would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2, developed for the Project.

In terms of human health risks associated with vehicle emissions, vehicle trips and thereby vehicle emissions along local roadways would increase with development of the Housing/R&D Variant, similar to the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations from traffic associated with the Housing/R&D Variant were estimated at selected roadways and compared against the 0.2 $\mu g/m^3$ action level to determine the potential health risks on receptors attributed to vehicle emissions from the Housing/R&D Variant.

Several roadway segments were chosen based on whether Variant-related traffic would use these streets to access neighboring freeways and other areas of *San Francisco* and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

With the Housing/R&D Variant (Variant 2A), no receptors along the streets listed above would experience an increase in $PM_{2.5}$ concentrations in excess of the 0.2 $\mu g/m^3$ action level.[1267] Concentrations would not exceed the action level, and as such, impacts would be less than significant, similar to the Project.

[1266] ENVIRON, *Updated Air Quality Analysis Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Updated Variants 2A and 3 (Tower Variant D), Alternative 2, and Subalternative 4A*, April 26, 2010.
[1267] ENVIRON, *Updated Air Quality Analysis Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Updated Variants 2A and 3 (Tower Variant D), Alternative 2, and Subalternative 4A*, April 26, 2010.

Overall, the operational emissions generated by the Housing/R&D Variant (Variant 2A) would be bracketed by the amounts generated by the Project and the R&D Variant (Variant 1).

Noise and Vibration

As with the Project, construction activities for the Housing/R&D Variant (Variant 2A) would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels, similar to the Project.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Housing/R&D Variant, but not to a less-than-significant level, as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Housing/R&D Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Housing/R&D Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Housing/R&D Variant (Variant 2A) would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with the Housing/R&D Variant (Variant 2A) are shown in Table IV-24a (Housing/R&D Variant (Variant 2A) Modeled Traffic Noise Levels along Major Project Site Access Roads). Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. However, the Housing/R&D Variant (Variant 2A) would have slightly lower noise levels than the Project along Carroll Avenue and Gilman Avenue but would still be significant, as shown in the table. Measures available to address significant traffic noise increases in these residential areas are limited. As the ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City/Agency as the Lead Agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable, as with the Project.

Table IV-24a Housing/R&D Variant (Variant 2A) Modeled Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*2030 With Housing/R&D Variant*	*Variant-Related Increase*	*Allowable Increase*	*Significant Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	60.9	0	2	No
3rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	67.4	0.1	1	No
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	63.6	0.1	2	No
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	61.7	0.1	2	No
Ingalls Street north of Carroll Avenue	Residential	56.7	61.7	63.1	62.7	1.0	2	No
Carroll Avenue east of 3rd Street	Commercial	**52.6**	**53.8**	**58.1**	**57.3**	**3.5**	**3**	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**63.0**	**2.4**	**2**	**Yes**
Jamestown Avenue north of Harney Way	Residential	51.4	55.5	61.2	59.2	3.7	5	No
Harney Way west of Jamestown Avenue	Residential	52.6	59.0	59.6	59.7	0.7	3	No
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	67.9	-0.6	1	No

SOURCE: PBS&J, 2010

Because the Housing/R&D Variant (Variant 2A) would not include a football stadium, noise impacts identified for the Project from football games and concerts would not occur with implementation of the Housing/R&D Variant (Variant 2A).

The Housing/R&D Variant (Variant 2A) site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Housing/R&D Variant (Variant 2A) does not include an aviation component. Therefore, the Housing/R&D Variant (Variant 2A) would not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

As the Housing/R&D Variant (Variant 2A) would have a smaller footprint than the Project and would develop in the same location, the impact analysis for the Project to cultural and paleontological resources would be applicable to the Housing/R&D Variant (Variant 2A). The same significant and unavoidable impact to historic resources would occur with demolition of Buildings 211, 224, 231, and 253. Mitigation

measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing all other cultural/paleontological resource impacts to less than significant, the same as the Project.

Hazards and Hazardous Materials

As the Housing/R&D Variant (Variant 2A) would have the same types and mix of land uses and slightly less ground disturbance as the Project, the impact analysis for the Project with regard to hazards and hazardous materials would be applicable to the Housing/R&D Variant (Variant 2A). The Housing/R&D Variant (Variant 2A) would not introduce any uses that would handle or transport hazardous materials, other than routine household-type and landscaping chemicals, the risk of which was analyzed in the Draft EIR for the Project. There would be similar amounts of grading and excavation, with similar risks as the Project, of exposure to hazardous materials. The same structures would be demolished during site preparation. The introduction of housing and R&D on the stadium site would not be different from the significance conclusions set forth for the Project. All mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant, the same as for the Project. Therefore, the impact analysis for hazards and hazardous materials for the Housing'/R&D Variant (Variant 2A) would be bracketed by the impact analysis for the Project.

Geology and Soils

As the Housing/R&D Variant (Variant 2A) would have a smaller development footprint than the Project, and would place development in the same locations as the Project, the impact analysis for the Project with regard to geology and soils would apply to the Housing/R&D Variant (Variant 2A). In some areas of the stadium site, slightly different portions would be covered by structures (e.g., west of the stadium footprint); however, there are no geologic conditions in the portion of the stadium site that would be developed under the Housing/R&D Variant (Variant 2A) that would differ from the geologic conditions on the portion of the site where the stadium would be constructed. The potential impact from rock fragmentation at the Jamestown District under the R&D Variant (Variant 1) and Housing Variant (Variant 2) would not occur under the Housing/R&D Variant (Variant 2A). Mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant, the same as for the Project. The impacts of the Housing/R&D Variant (Variant 2a) with respect to geology and soils would be bracketed by the analysis for the Project.

Hydrology and Water Quality

The Housing/R&D Variant (Variant 2A) would have slightly less impermeable surface area than the Project, as noted, above. The same type and mix of land uses would be developed under Variant 2A as the Project. Therefore, the impact analysis for the Project with regard to Hydrology and Water Quality would also apply to the Housing/R&D Variant (Variant 2A). Mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant, the same as for the Project.

Biological Resources

The Housing/R&D Variant (Variant 2A) would disturb slightly less surface area than the Project, as noted, above. The locations of development are substantially the same as under the Project. Development would

not occur on any portion of the site that has not been previously analyzed, except for a small portion on the south side of Crisp Road that would now contain structures. However, there are no sensitive species or habitat in this location that would be adversely affected by development. Therefore, the impact analysis for the Project with regard to biological resources would apply to the Housing/R&D Variant (Variant 2A). Mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant, the same as for the Project.

Public Services

Public Services impacts are based on adequacy of service provided to the population. The Housing/R&D Variant (Variant 2A) would result in the same number of residents as the Project, as the number of dwelling units would be the same. The Housing/R&D Variant (Variant 2A) would generate 11,629 jobs, less than the 16,635 jobs estimated for the R&D Variant. Therefore, the impacts on Public Services analyzed for the R&D Variant (Variant 1) would also apply to the Housing/R&D Variant (Variant 2A), as the population and employment generated are within the maximums previously analyzed under the R&D Variant (Variant 1). The impacts would be less than significant, bracketed within the analysis for the Project and the R&D Variant (Variant 1). Mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant.

Recreation

The Housing/R&D Variant (Variant 2A) would provide 326.6 acres of parkland, which is 9.8 acres less than the Project. The conceptual development plan for this Variant would result in the development of residential units and parks during all stages of development. Table IV-26a (Housing/R&D Variant [Variant 2A] Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Housing/R&D Variant). As this table indicates, the park-to-population ratio would not drop below 13.3 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population.

Mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant, the same as for the Project.

Table IV-26a Housing/R&D Variant (Variant 2A) Residential Units and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*
Existing	256	1,113[a]	120.2	108
Phase 1	3,160	7,363[b]	136.0	18.5
Phase 2	4,410	10,275[b]	162.5	15.8
Phase 3	7,785	18,139[b]	246.7	13.6
Phase 4	10,500	24,465[b]	326.6	13.3

SOURCE: Lennar Urban, 2010.

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Employment, and Housing). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.

b. Calculated as 2.33 people per residential unit.

Utilities

A supplemental Water Demand Memo (refer to Appendix Q2 [Arup, Amendment to Water Demand Memorandum #16—Variant 2A (Housing/R&D Variant), April 28, 2010]) was prepared to calculate the water demand for the Housing/R&D Variant (Variant 2A). As shown in Table IV-27a (Housing/R&D Variant [Variant 2A] Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance [mgd]), total demand for potable water would be 1.73 mgd, which is less than the 1.99 mgd calculated for the R&D Variant (Variant 1). Calculating wastewater generation based on land use (residential, football stadium, and performance venue calculated at 95 percent of water demand; all other land uses calculated at 57 percent of water demand), the total wastewater generated by the Housing/R&D Variant (Variant 2A) would be 1.23 mgd (refer to Table IV-28a [Housing/R&D Variant [Variant 2A] Wastewater Generation]), which is less than the 1.35 mgd calculated for the R&D Variant (Variant 1). Mitigation measures identified for the Project and the R&D Variant (Variant 1) would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant.

With regard to solid waste generation, Table IV-30a (Housing/R&D Variant (Variant 2A) Solid Waste Generation) shows that the total amount of solid waste that would result from implementation of the Housing/R&D Variant (Variant 2A) would be 20,036 tons per year, 2,189 tons less than under the R&D Variant (Variant 1), which would generate 22,225 tons (refer to Table IV-14 [R&D Variant Solid Waste Generation] on page IV-62 of the EIR). Therefore, the analysis of solid waste for the Housing/R&D Variant (Variant 2A) would be bracketed by the analysis for the R&D Variant (Variant 1). Similar to the R&D Variant (Variant 1), solid waste generated by the Housing/R&D Variant (Variant 2A) could be accommodated by the remaining landfill capacity with implementation of the strategies for diversion of waste as described in Section III.Q (Utilities) of the EIR. Mitigation measures identified for the Project and the R&D Variant (Variant 1) would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant.

Table IV-27a Housing/R&D Variant (Variant 2A) Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance (mgd)

Land Use	*Candlestick Point*	*Hunters Bay Shipyard*	*Total*
Residential	0.48	0.35	0.83[a]
Hotel	0.05	0.00	0.05
Office	0.04	0.00	0.04
Artists Studios	0.00	0.01	0.01
R&D	0.00	0.43	0.43
Neighborhood Retail	0.02	0.02	0.03[a]
Regional Retail	0.08	0.00	0.08
Community Uses	0.01	0.01	0.02
Football Stadium	0.00	0.00	0.00
Performance Venue	0.01	0.00	0.01
Subtotal	*0.70[a]*	*0.82[a]*	*1.52[a]*
Parks and Open Space	0.06	0.15	0.22
Total Demand	***0.76[a]***	***0.97[a]***	***1.73***

SOURCE: Arup, Candlestick Point–Hunters Point Shipyard Phase II Water Demand Memorandum, April 2010.

a. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals used in this table. These entries are correct and are consistent with Table 13 of the Water Demand Memorandum.

Table IV-28a Housing/R&D Variant (Variant 2A) Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed as % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total Housing Variant (mgd)*
Residential	95%	0.46	0.33	0.79
Hotel	95%	0.03	0.00	0.03
Office	57%	0.02	0.00	0.02
Artists Studios	57%	0.00	0.01	0.01
R&D	57%	0.00	0.25	0.25
Neighborhood Retail	57%	0.01	0.01	0.02
Regional Retail	57%	0.05	0.00	0.08
Community Uses	57%	0.01	0.01	0.02
Football Stadium	95%	0.00	0.00	0.00
Performance Venue	95%	0.01	0.00	0.01
Total		***0.59***	***0.61***	***1.23***

SOURCE: Arup, March 31, 2010.

Table IV-30a Housing/R&D Variant (Variant 2A) Solid Waste Generation

		Candlestick Point			*HPS Phase II*			*Total*		
Use	*Generation Factor (per day)*	*Area or Units*	*Tons per Day or Event*	*Tons per Year*	*Area or Units*	*Tons per Day or Event*	*Tons per Year*	*Area or Units*	*Tons per Day or Event*	*Tons per Year or per Total Number of Events*[a]
Residential	5.653 lbs/unit	6,225	17.6	6,422	4,275	12.1	4,410	10,500	29.7	10,832
Retail	0.02600411 lbs/sf	760,000 sf	9.9	3,613.5	125,000 sf	1.6	584.0	885,000 sf	11.5	4,197.5
Office	0.006 lbs/sf	150,000 sf	0.5	182.5	0	0	0	150,000 sf	0.5	182.5
Hotel	0.0108 lbs/sf	150,000 sf	0.8	292.0	0	0	0	150,000 sf	0.8	292.0
R&D	0.006 lbs/sf	0	0	0	3,000,000 sf	9	3,285	3,000,000 sf	9	3,285
Performance Venue	2.23 lbs/seat	10,000 seats	5.6[b]	836.3[c]	0	0	0	10,000 seats	5.6	836.3[c]
Stadium	2.23 lbs/seat	0	0	0	0	0	0	0	0	0
Artist Studios/Art Center	0.006 lbs/sf	0	0	0	255,000 sf	0.8	292	255,000 sf	0.8	292.0
Community Facilities	0.006 lbs/sf	50,000 sf	0.15	54.8	50,000 sf	0.15	54.8	100,000 sf	0.3	109.6
Total				***13,082***			***6,954***			***20,036***

SOURCE: PBS&J 2010; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

a. Calculated by adding the horizontal columns, rather than calculating total number of units by the generation rate.

b. The Performance venue is projected to be 50 percent attendance.

c. Assumes 150 events per year at 50 percent attendance.

Energy

As shown below in Table IV-31a (Housing/R&D Variant [Variant 2A] Electricity Demand from Building Envelopes [MWh]), the Housing/R&D Variant (Variant 2A) would be expected to result in an electricity demand of approximately 33,105 Megawatt hours (MWh). This represents a 21 percent decrease in electrical consumption compared to the R&D Variant (Variant 1). Therefore, as the electricity demand for Variant 2A would be less than what has been analyzed for Variant 1, the impacts have been bracketed by the analysis for the R&D Variant (Variant 1) and would be similarly less than significant. Mitigation measures identified for the Project would be implemented for the Housing/R&D Variant (Variant 2A), reducing the impacts to less than significant.

Greenhouse Gas Emissions

A greenhouse gas emissions analysis was conducted for the Housing/R&D Variant (Variant 2A) and the analysis is provided in Appendix T5 (ENVIRON, Updated Greenhouse Gas Emissions Calculation for Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Variants 2A and 3 [Tower Variant D], Alternative 2, and Subalternative 4A, March 12, 2010).

Operational impacts to climate change and GHG emissions would be substantially similar to the Project. Under the Housing/R&D Variant (Variant 2A), as shown in Appendix T5, the operational GHG emissions for the Housing/R&D Variant (Variant 2A) would be higher than the Project GHG emissions by 7,013 tonnes of CO_2e per year. As noted in Table IV-17 on page IV-69 of the Draft EIR, the R&D Variant (Variant 1) would emit 178,651 tonnes of CO_2e per year, 14,488 tonnes more than the Housing/R&D Variant (Variant 2A). All mitigation measures and improvements in electricity carbon intensity and energy efficiency of the buildings under the Project and the R&D Variant (Variant 1) would be implemented with the Housing/R&D Variant (Variant 2A). This would result in substantially similar reductions of GHG emissions as the Project and, like the Project and the R&D Variant (Variant 1), the Housing/R&D Variant (Variant 2A) would make a less-than-significant contribution to the cumulative impacts of climate change and GHG emissions. For the same reasons as stated for the Project, the Housing/R&D Variant (Variant 2A) would not impede the achievement of San Francisco's GHG emission reduction ordinance nor the statewide emission reductions required under AB 32, which is also called the *California Global Warming Solutions Act of 2006*.

BAAQMD Draft GHG Thresholds

With mitigation, the Housing/R&D Variant-related operational emissions of 161,596 tonnes per year result in 4.6 tonnes CO_2e per service population per year based on a service population of 35,498 (this accounts for 23,869 net new residents [based on 2.33 residents per household and accounting for existing units on site] and all 11,629 jobs). The operational emissions of the Project were identified as totaling 4.5 tonnes CO_2e per year, and emissions of the Housing Variant (Variant 2) were identified as totaling 4.6 tonnes CO_2e per year. As the Housing/R&D Variant (Variant 2A) would result in a substantially similar amount of CO_2e per year as the Project and the Housing Variant (Variant 2), previously analyzed, like the Project and the Housing Variant (Variant 2), the Housing/R&D Variant (Variant 2A) would result in a less-than-significant impact on climate change.

Table IV-31a Housing/R&D Variant (Variant 2A) Electricity Demand from Building Envelopes (MWh)

		Candlestick Point			HPS Phase II			Project Site Total			
Type of Use	*Electricity Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)*[a]	*Development Program*[b]	*MWh Consumed Annually, 2008 Title 24 Standards*[c]	*MWh Consumed Annually, with 15% Reduction*	*Development Program*[b]	*MWh Consumed Annually, Title 24 Standards*[c]	*MWh Consumed Annually, with 15% Reduction*	*Development Program*	*MWh Consumed Annually, Title 24 Standards*	*MWh Consumed Annually, with 15% Reduction*	*Percent of Total Electricity by Land Use*
Residential Units	1.7350[d]	6,225	10,800	9,180	4,275	7,417	6,304	10,500	18,218	15,485	47%
Retail	0.0027	635,000	1,715	1,457	—	0	0	635,000	1,715	1,457	4%
Neighborhood Retail	0.0027	125,000	338	287	125,000	338	287	250,000	675	574	2%
Office	0.0052	150,000	780	663	—	0	0	150,000	780	663	2%
R&D	0.0052	—	0	0	3,000,000	15,600	13,260	3,000,000	15,600	13,260	40%
Hotel	0.0027	220	1	1	—	0	0	220	1	1	0%
Artist Studios/ Center	0.0052	—	0	0	255,000	1,326	1,127	255,000	1,326	1,127	3%
Community Space	0.0052	50,000	260	221	50,000	260	221	100,000	520	442	1%
Arena	0.0015	75,000	113	96	—	0	0	75,000	113	96	0.3%
Total			***14,007***	***11,905***		***24,941***	***21,200***		***38,948***	***33,105***	***100%***

SOURCES:

Housing/R&D Variant (Variant 2A) electricity demand was estimated based on the Applicant's commitment to achieve 15 percent energy reductions below Title 24 standards and use ENERGY STAR appliances in all residential units.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor was derived by subtracting the "Plug-in" factor from the "Electricity Delivered, Total" column (in the "15 percent Better than Title 24 2008 and ENERGY STAR Appliances" row). The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. Based on buildout floor areas provided in Table IV-3 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

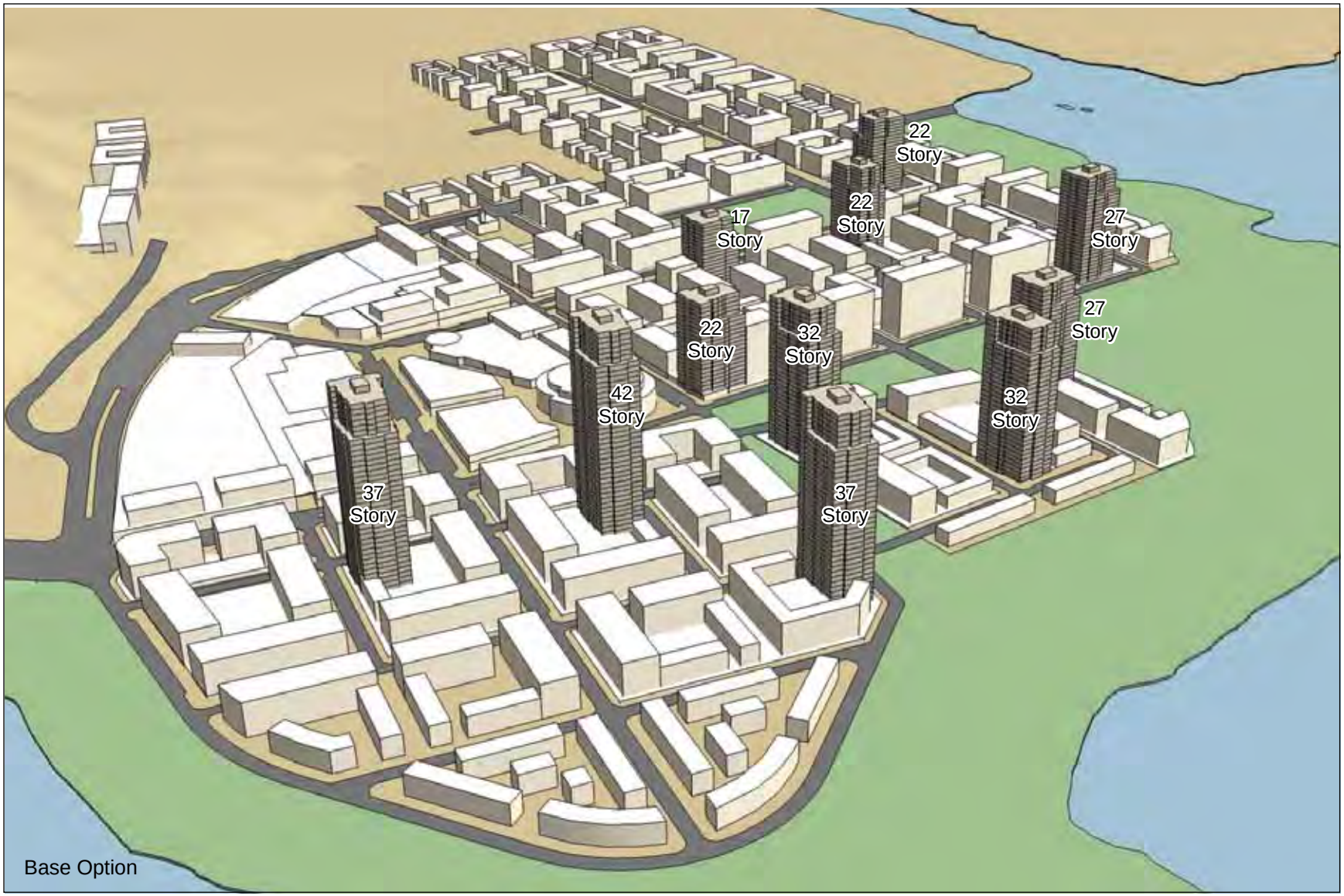
d. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

IV.D VARIANT 3: CANDLESTICK POINT TOWER VARIANTS

IV.D.1 Overview

- The Candlestick Point Tower Variants (Tower Variants) would have different locations and heights and bulk of residential towers at Candlestick Point. The four Candlestick Point Tower Variants (Tower Variants A, B, C, and D) would have the same overall land use program as the Project. While there would be different tower locations and heights with these variants, the total number of residential units, 10,500, would remain the same as the Project. Figure IV-13 (Project Towers at Candlestick Point) illustrates a perspective view of the 11 towers proposed at Candlestick Point with the Project to provide a comparison to the Tower Variants. The Tower Variants include the following:
  - **Tower Variant A** would add ten stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower, as shown in Figure IV-14 (Tower Variant A). Three other residential towers at Candlestick Point South would have three to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project.
  - **Tower Variant B** would have an additional 24-story residential tower at Candlestick Point Center. One 17-story tower at Candlestick Point North would be removed as shown in Figure IV-15 (Tower Variant B). Three other towers at Candlestick Point South would have would have two to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project.
  - **Tower Variant C** would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variant B, as shown in Figure IV-16 (Tower Variant C). The variant would also add ten stories to one of the 22-story residential towers at Candlestick Point North, as with Tower Variant A, resulting in a 32-story residential tower. To maintain the overall residential floor area of the Project with this Variant, one 17-story tower and one 22-story at Candlestick Point North would be removed and at Candlestick Point South, one tower would have two fewer floors and one would have six fewer floors. The variant would have 10 towers at Candlestick Point, compared to 11 towers with the Project.
- - **Tower Variant D** would reduce a 37-story tower to 31 stories within Candlestick Point South; one 27-story residential tower at Candlestick Point South would be lowered to 24 stories, or three fewer floors; and one 32-story tower would be relocated from Candlestick Point South to Candlestick Point North. This Variant would add 10 stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower; one 22-story tower and one 17-story tower would be relocated within Candlestick Point North; and one residential tower at Candlestick Point North would be lowered to 24 stories, or three fewer floors. This Variant would have an additional 24-story residential tower at Candlestick Point Center. This Variant would have 12 towers at Candlestick Point, compared to 11 towers with the Project. The floor plate area of the residential towers would be increased to 12,500 sf compared to the 10,000 sf analyzed for the Project, which would result in slightly greater tower bulk. However, the larger floor plates would be accommodated on the existing podium design and, therefore, the building footprint would not increase.
- As shown in Figure IV-13 through Figure IV-16a (Tower Variant D), the Tower Variants' overall street and block plan would be same as that of the Project. All other features of the Tower Variants would also be the same as the Project.



SOURCE: Lennar Urban, IBI Group, 2009.

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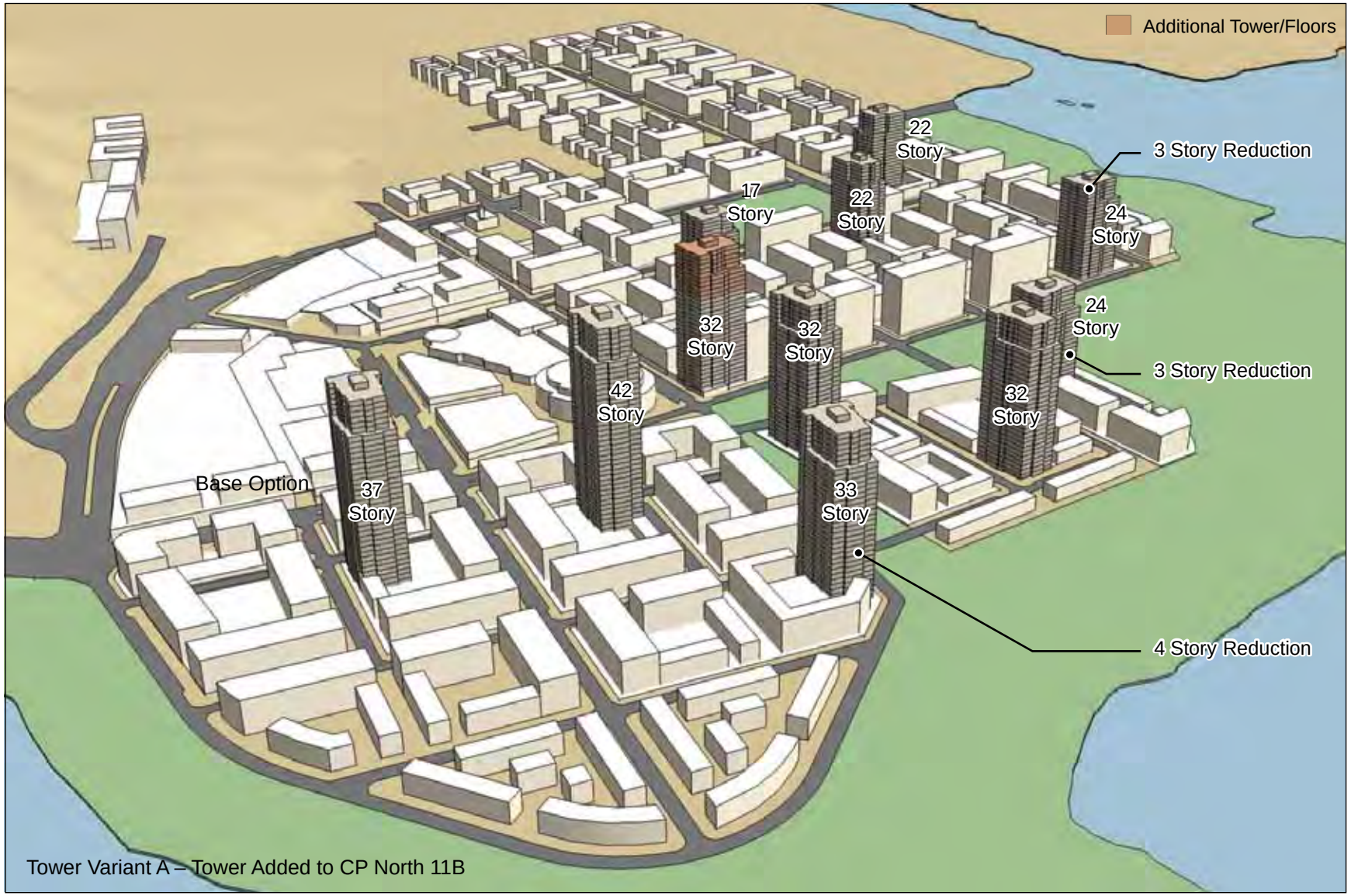
FIGURE IV-13

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT TOWERS AT CANDLESTICK POINT



SOURCE: Lennar Urban, IBI Group, 2009.

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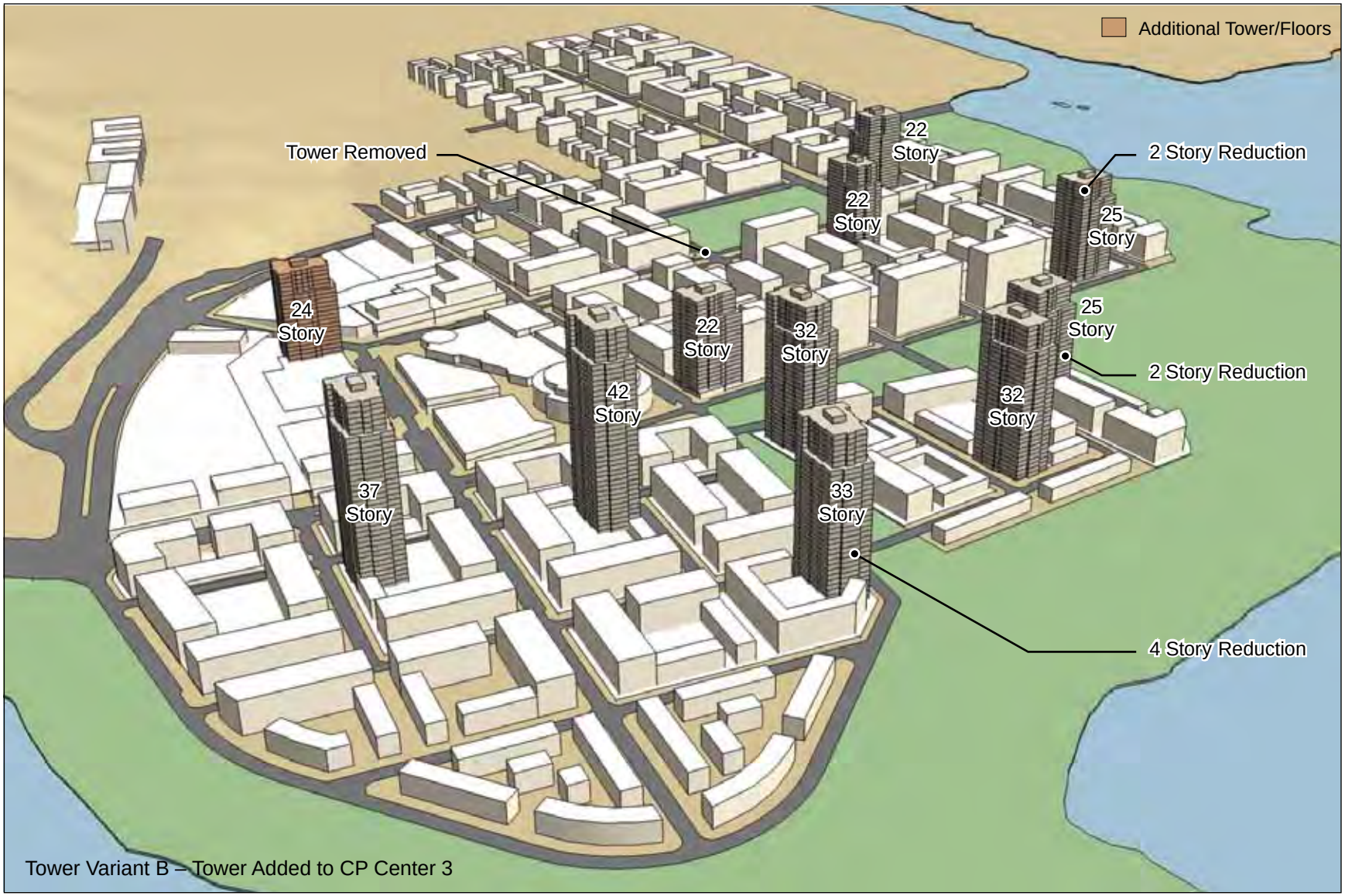
FIGURE IV-14

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT A



SOURCE: Lennar Urban, IBI Group, 2009.

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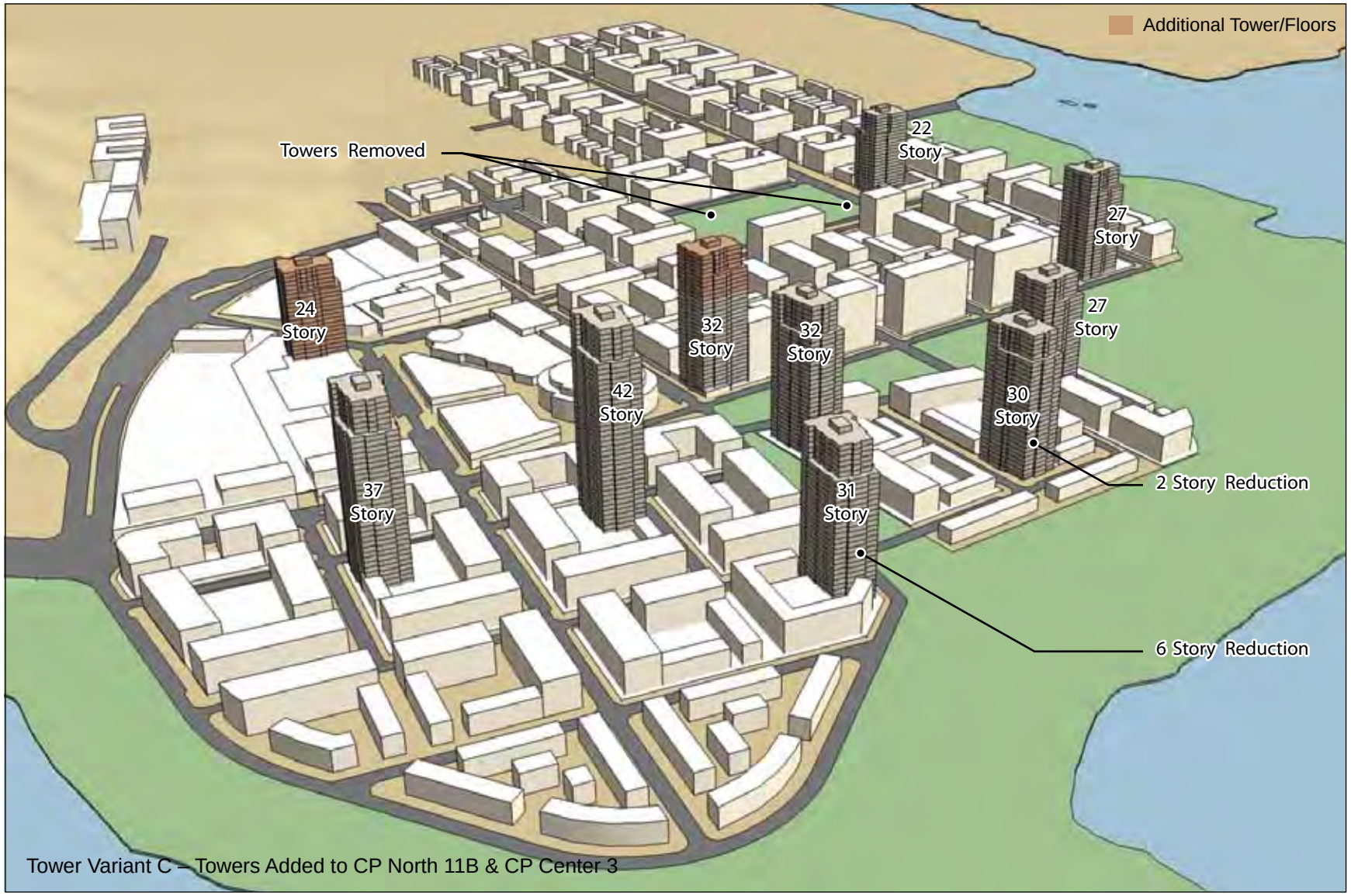
Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT B

FIGURE IV-15



SOURCE: Lennar Urban, IBI Group, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-16

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT C

SOURCE: Lennar Urban, IBI Group, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16a

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D

IV.D.2 Project Objectives

The objectives for the Tower Variants would be the same as for the Project. A full list of Project objectives is provided in Section II.D of this EIR.

IV.D.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While each of these components of the Project would also apply to this variant, Figure II-5 (Proposed Maximum Building Heights) in Chapter II would be different for this variant.

■ Tower Variant A

Tower Variant A would add ten stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower. Three other residential towers at Candlestick Point South would have three to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project.

All other features of Tower Variant A would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint.

■ Tower Variant B

Tower Variant B would have an additional 24-story residential tower at Candlestick Point Center. One 17-story tower at Candlestick Point North would be removed. Three other towers at Candlestick Point South would have would have two to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project. All other features of Tower Variant A would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint

■ Tower Variant C

Tower Variant C would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variant B. The variant would also add ten stories to one of the 22-story residential towers at Candlestick Point North, as with Tower Variant A, resulting in a 32-story residential tower. To maintain the overall residential floor area of the Project with this Variant, one 17-story tower and one 22-story at Candlestick Point North would be removed and at Candlestick Point South, one tower would have two fewer floors and one would have six fewer floors. The variant would have 10 towers at Candlestick Point, compared to 11 towers with the Project. All other features of Tower Variant C would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint.

■ Tower Variant D

Tower Variant D is based on height, bulk and massing requirements for vertical development within the Project site as described in the Design For Development. The Design For Development identifies specific

locations for certain towers and allows towers in certain "tower zones." Where the Design For Development allows placement of towers within a "tower zone," the Tower Variant D analysis assumes a specific tower location within proposed tower zones, which in some instances could potentially increase new shading on existing open space owned by or under the jurisdiction of the San Francisco Recreation and Park Department (SFRPD). Figure C&R-1 (Tower Variant D Tower Zones Map) indicates where the Design For Development identifies tower zones and the assumed location of towers within those zones for purposes of the Tower Variant D analysis.

Tower Variant D would reduce one 37-story tower to 31 stories, or six fewer floors, in Candlestick Point South; one 27-story residential tower at Candlestick Point South would be lowered to 24 stories, or three fewer floors; and one 32-story tower would be relocated from Candlestick Point South to Candlestick Point North. This Variant would add 10 stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower, as with Tower Variants A and C; one 22-story tower and one 17-story tower would be relocated within Candlestick Point North; one residential tower at Candlestick Point North and one residential tower at Candlestick Point South would be lowered to 24 stories, or three fewer floors, as with Tower Variant A. This Variant would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variants B and C. This Variant would have 12 towers at Candlestick Point, compared to 11 towers with the Project.

The residential tower floor sizes with Tower Variant D would be a maximum of 12,500 square feet, compared to 10,500-square-foot maximum floor sizes with the Project. All other features of Tower Variant D would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint. With Tower Variant D, the two residential towers at HPS Phase II proposed with the Project would also have floor sizes with a maximum of 12,500 square feet, compared to 10,500-square-foot maximum floor sizes with the Project.

IV.D.4 Potential Environmental Effects

Overall, the Tower Variants would not change the total amount of development compared to the Project, but the Tower Variants would change the location or height of residential towers, as described above.

Thus, changes in environmental effects of the Tower Variants, compared to the Project, would result from the location or height of residential towers. As the total amount of development and the development footprint would be the same as the Project, most of the construction-related and operational environmental effects of the Tower Variants would be the same as the Project, as discussed below. For most environmental topics, the effects of all three Tower Variants would be the same, except where noted below.

Land Use and Plans

As the total amount of development and the development footprint would be the same as the Project, development of a Tower Variant would not physically divide an established community or conflict with plans, policies, or regulations adopted to avoid or mitigate an environmental effect. Operation of a Tower Variant would alter the existing character of the vicinity, but the modified heights, number, and location of residential towers would be consistent with uses and building characteristics proposed with the Project. Therefore, the additional structures, change in location of some structures, and the increase in height of

some structures would not result in an adverse change to the character of the site or the surrounding areas and each Tower Variant would result in a less-than-significant impact, similar to the Project.

Population, Housing, and Employment

As discussed above, a Tower Variant would include the same development proposed with the Project, including equivalent amounts of residential, commercial, and other land uses. Thus short-term employment opportunities during the construction period would be similar to the Project. Development and occupancy of a Tower Variant would result in the same population changes as with the Project. While operation of a Tower Variant could induce population growth directly and/or indirectly, this growth would not be substantial and a Tower Variant would result in a less-than-significant impact, similar to the Project. As with the Project, a Tower Variant would not displace existing housing units or residents at Candlestick Point (as replacement housing would be provided prior to removal of any existing units), and construction of replacement housing would not be necessitated elsewhere. Thus, potential population, employment, and housing impacts of a Tower Variant would be less than significant, similar to the Project.

Transportation and Circulation

As the footprint of development, the total amount of development, and the land uses provided under a Tower Variant would be similar to the Project, traffic impacts for a Tower Variant would also be similar to the Project. While there would be additional towers under the Tower Variant, the total number of residential units would remain the same as the Project. Transportation impacts associated with the Tower Variant would be the same as those identified for the Project. The impacts identified would be the same and the mitigation measures would be the same, as those identified for the Project.

Although the Tower variant would increase the local traffic in the blocks where density increases, the Tower Variant would not result in an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, and would be the same as analyzed for the Project. A Tower Variant would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management plan (CMP) for roads or highways.

The Tower Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or other airport land use plan, and a Tower Variant would not result in a safety hazard from airport operations for people residing or working in the area. The Tower Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Therefore, the Tower Variants would result in a less than significant impact to aircraft activity and traffic levels, similar to the Project.

Development under a Tower Variant would not affect or increase hazards due to design features or incompatible uses aboveground. The new buildings would be designed consistent with the SFBC, which would reduce all potential design hazards to a less than significant level. The roadway network associated with a Tower Variant would be designed to meet all applicable codes, including design guidelines for emergency access, and would result in a less than significant impact associated with design hazards. As the same amount of development would result from a Tower Variant as the Project, and since the same design standards would apply for both, potential traffic impacts from design hazards would be similar to the Project.

Thus substantial additional parking, above that provided by the Project, would not be required, and impacts would be less than significant. As the same amount of development and the same land uses would occur under a Tower Variant as with the Project, parking impacts would be similar to the Project.

The Tower Variants would comply with adopted policies and plans regarding alternative transportation, and impacts would be less than significant, similar to the Project.

Aesthetics

Changes in effects on aesthetics and visual resources with the Tower Variants, compared to the Project, would result from the location or height of residential towers. A Tower Variant would include up to 11 towers, as with the Project, change the location of one or two towers, increase height of some towers and reduce the height of others, as described above under Characteristics.

Construction activities associated with a Tower Variant would not have a substantial adverse effect on a scenic vista or scenic resources, similar to the Project. Construction activities associated with a Tower Variant could result in temporary degradation of the visual character or quality of the site. With the implementation of mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts During Construction) to screen construction sites from public view and provide for appropriate staging and cleaning of construction equipment, impacts would be reduced to a less-than-significant level, similar to the Project. Construction activities associated with a Tower Variant would not create a new source of substantial light or glare that would adversely affect day or night views in the area, or that would substantially impact other people or properties, and impacts would be less than significant, similar to the Project.

The pattern and scale of buildings at Candlestick Point with the Tower Variants would be similar to the Project. All Tower Variants would have 10 or 12 towers, compared to 11 towers with the Project. As shown in Figure IV-14 to Figure IV-16a, the Tower Variants would include at least six of the 11 residential towers proposed with the Project in the identical location, with differences in the number floors of four of the towers (Tower Variant A); or would relocate a tower from Candlestick Point North to Candlestick Point Center and reduce the number floors of three other towers (Tower Variant B); or relocate a tower from Candlestick Point North to Candlestick Point Center, remove another tower from Candlestick Point North and reduce the number floors of two other towers, and add 10 floors at one tower (Tower Variant C and D); Tower Variant D would relocate a 37-story tower and reduce total floors to 31 stories within Candlestick Point South; one 32-story tower would be relocated from Candlestick Point South to Candlestick Point North; one 22-story tower and one 17-story tower would be relocated within Candlestick Point North; and one additional 24-story residential tower would be added at Candlestick Point Center. Tower Variant D would have 12 towers at Candlestick Point, compared to 11 towers with the Project.

Tower Variant D would have maximum floor sizes of 12,500 square feet, compared to 10,500 square foot maximum floor sizes with the Project. Tower Variant D dimensions and visibility would be slightly greater than with the Project; overall visual effects would be similar to the Project.

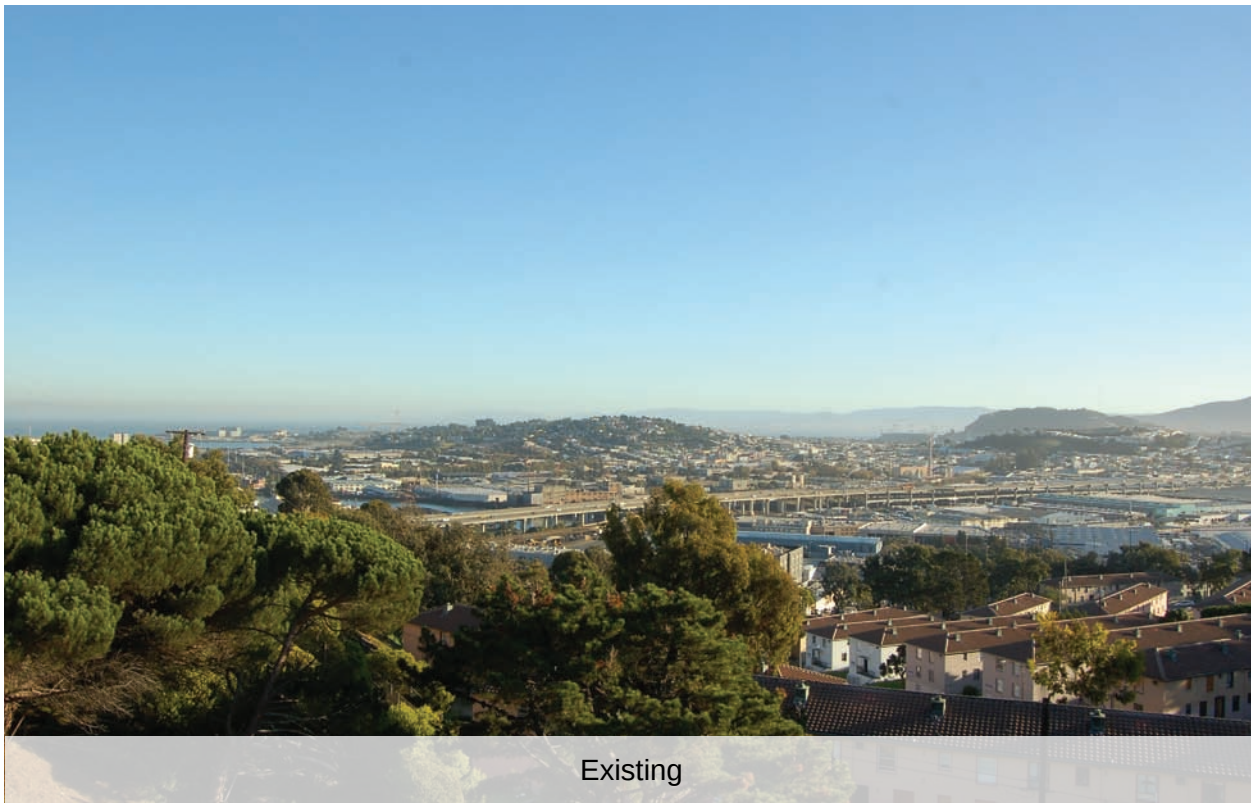
Views of Candlestick Point from long-range vantage points to the north and south or from nearby locations at CPSRA would be similar to views with the Project. Some the towers would have different heights compared to the Project, depending upon the Variant. Views of the relocated 24-story tower with Tower Variant B, C, or D would be apparent from locations to the south, but Tower Variant B or C would also

remove one or two towers from Candlestick Point North near Candlestick Point North Neighborhood Park, and views of residential towers from near that proposed park would vary from those with the Project. The towers at Candlestick Point would range from 220 feet to 420 feet in height. Tower Variant D would relocate one 32-story tower farther from CPSRA and would reduce the height of three towers adjacent to CPSRA (two by three stories and one by six stories), compared to the Project (see Figure IV-16a. Those changes would reduce the visibility of towers from CPSRA open space. Among the Tower Variants, Tower Variant D would have the most changes, compared to the Project, in terms total numbers of towers and larger maximum floor sizes. Therefore, the text below provides more detailed discussion of the visual quality effects of Tower Variant D.

Figure IV-16b (Tower Variant D, View 4: South from Potrero Hill) through Figure IV-16k (Tower Variant D, View 19: East from Hunters Point Hill Open Space) include visual simulations of Tower Variant D from 10 of the 20 viewpoints provided in Section III.E (Aesthetics). Figure III.E-11 (View 1: Southeast from Twin Peaks) through Figure III.E-30 (View 20: Southeast from Heron's Head Park). Figure IV-16b through Figure IV-16k can be compared to the corresponding visual simulations for the Project from those ten locations. The ten locations provide representative information of visual effects of Candlestick Point Tower Variant D (refer to Figure III.E-10 [Viewpoint Locations], page III.E-23).

Figure IV-16b (Tower Variant D, View 4: South from Potrero Hill) illustrates the long-range view from Potrero Hill to the south and the Bay beyond that would include Tower Variant D residential towers at Candlestick Point, between Hunters Point Hill and Bayview Hill, ranging from 240 feet to a maximum 420 feet in height, as with the Project. The towers would replace distant existing views of Candlestick Park stadium and surrounding parking areas. The towers would appear similar to conditions with the Project, as shown in Figure III.E-14 (View 4: South from Potrero Hill). The Tower Variant would be visible from this location, against San Francisco Bay as a background, and the residential towers at Candlestick Point would be a new built element between Bayview Hill and Hunters Point Hill. As with the Project, views of the Bay or the East Bay hills would be partially blocked, but a substantial portion of the view would remain. HPS Phase II would also be a new element seen against the Bay and the East Bay hills.

Figure IV-16c (Tower Variant D, View 5: Northeast from Northbound US-101) illustrates the long-range view with Tower Variant D high-rise structures that would be visible on the Candlestick Point portion of the site, ranging from 240 feet to a maximum 420 feet in height, with lower-scale development to the west. Tower Variant D would include an additional 240-foot tower at Candlestick Point Center, visible east of Bayview Hill in Figure IV-16c The towers would appear relatively clustered, compared to conditions with the Project shown in Figure III.E-15 (View 5: Northeast from Northbound US-101). The high-rise buildings would be prominent, but would not obstruct views of Bayview Hill. As with the Project, the easterly towers in this view would be on land that was formerly part of the CPSRA. The shoreline of CPSRA would be visible as the foreground. Bayview Hill would continue as a landmark and the Bay would continue as foreground in this view.



Existing

Proposed

SOURCE: Lennar Urban, 2010.

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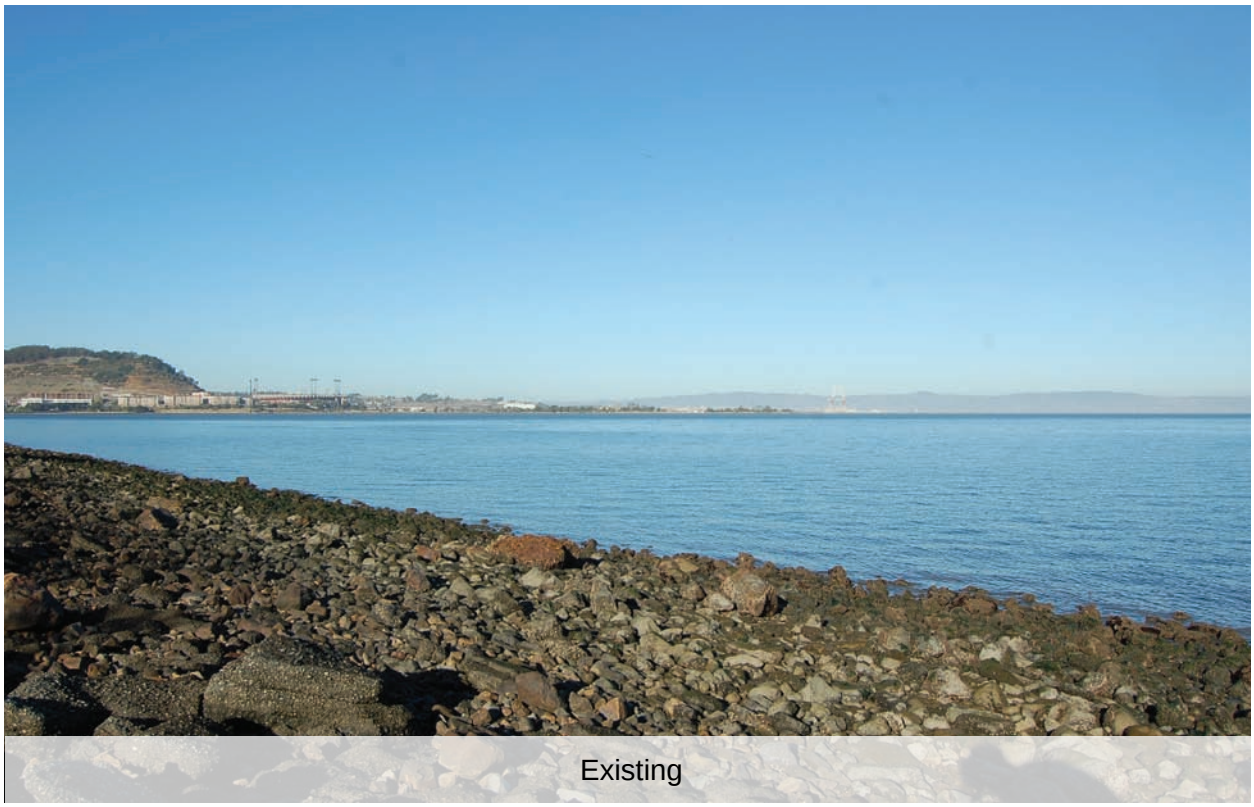
FIGURE IV-16b

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 4: SOUTH FROM POTRERO HILL



Existing

Proposed

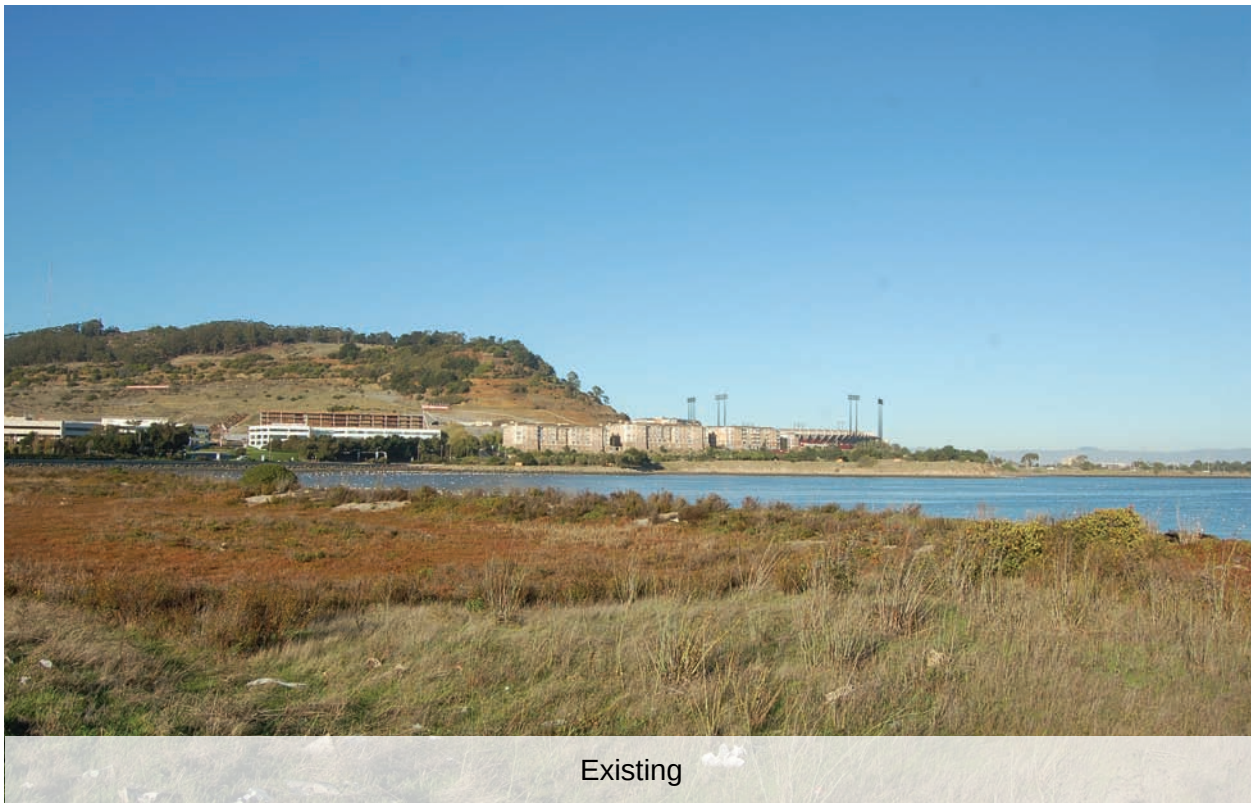
SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16c

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 5: NORTHEAST FROM NORTHBOUND US-101



Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16d

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 6: NORTHEAST FROM US 101 AT HARNEY WAY OFF-RAMP

Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16e

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 7: NORTHEAST FROM SAN BRUNO MOUNTAIN

Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16f

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 9: NORTH FROM CPSRA SOUTH OF HARNEY WAY

Existing

Proposed

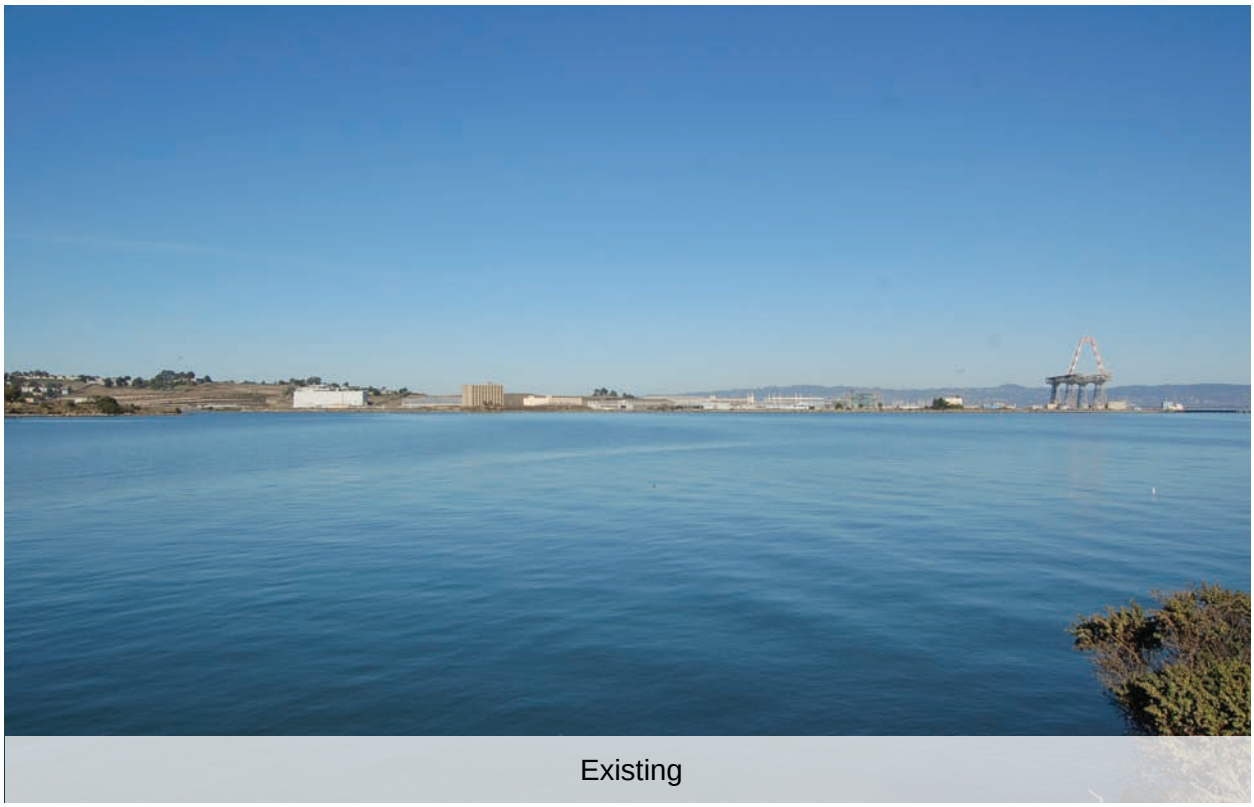
SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

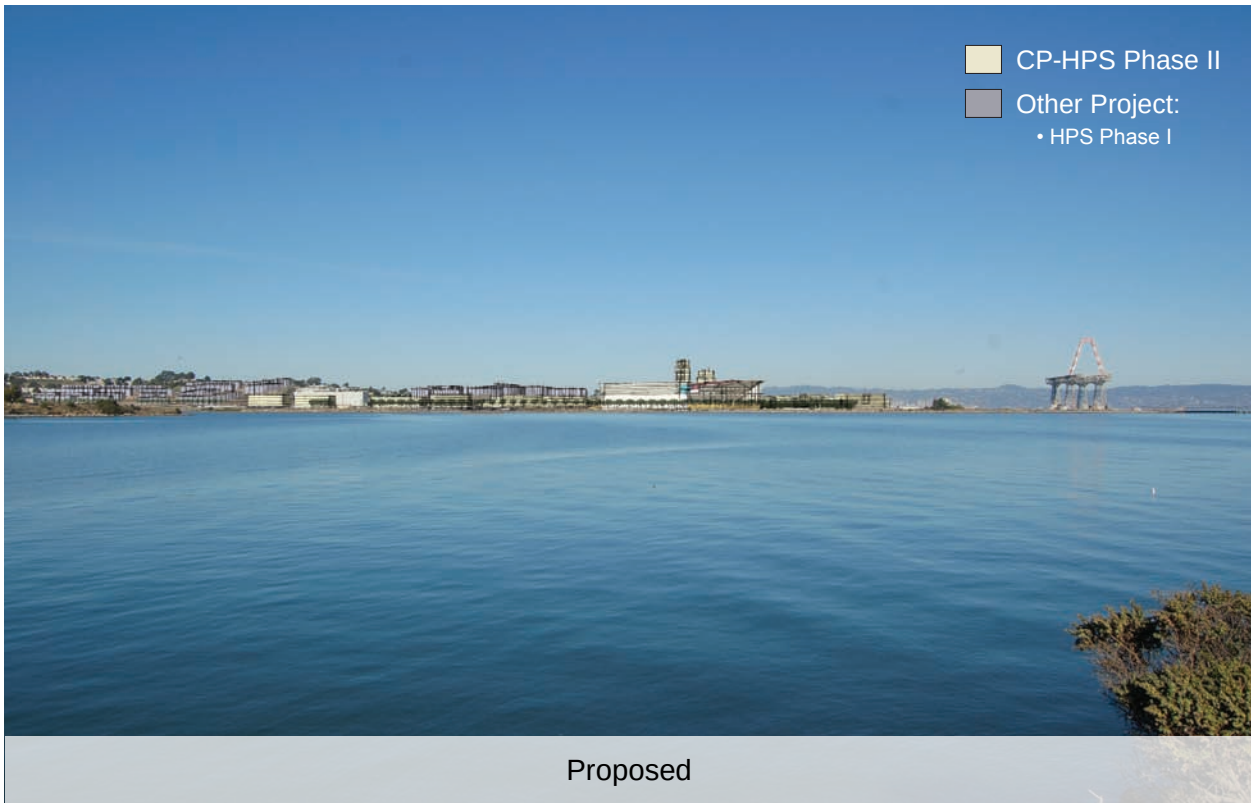
FIGURE IV-16g

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 11: NORTHWEST FROM CPSRA



Existing



Proposed

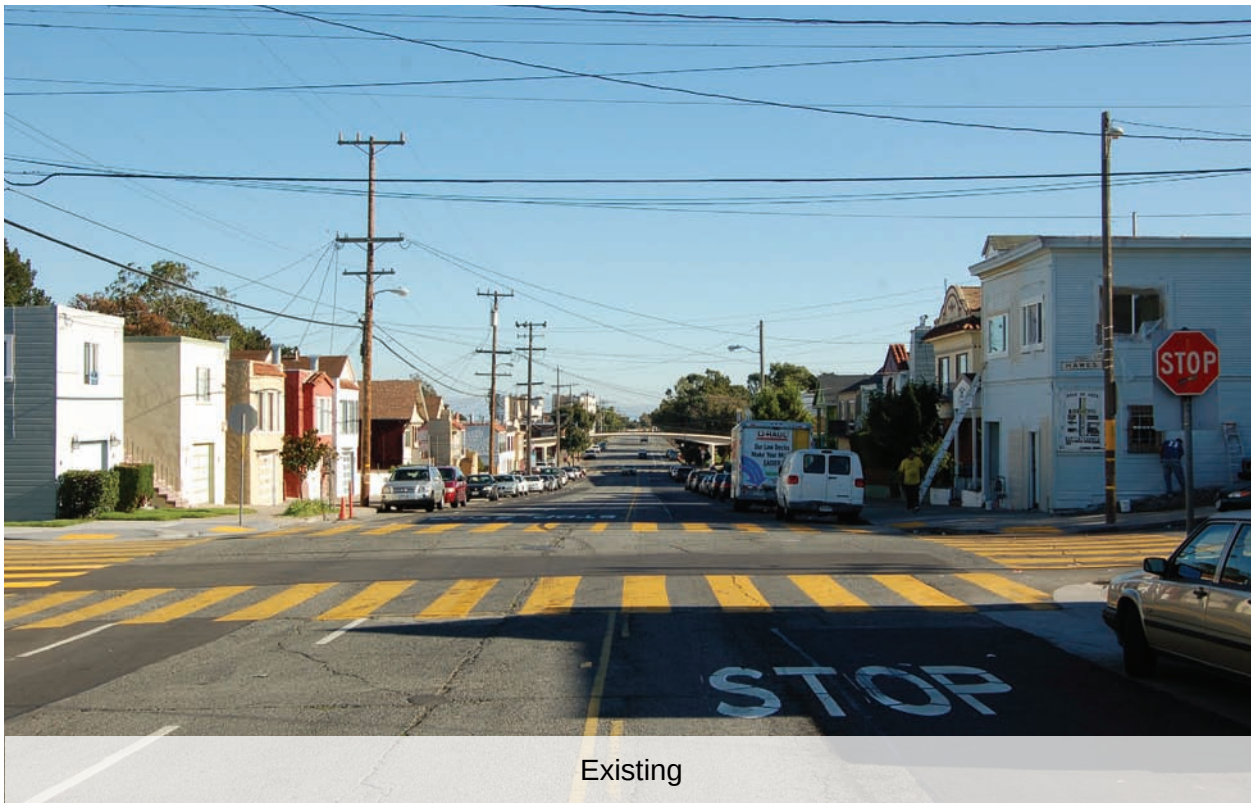
SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16h

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 17: NORTHEAST FROM CPSRA



SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16i

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 12: SOUTHEAST FROM GILMAN AVENUE

Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16j

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 16: SOUTHWEST FROM MARINER VILLAGE

Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.09.10 02056 | JCS | 10

FIGURE IV-16k

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT D
VIEW 19: EAST FROM HUNTERS POINT HILL OPEN SPACE

As shown in Figure IV-16d (Tower Variant D, View 6: Northeast from US-101 at Harney Way Off-Ramp), Tower Variant D would introduce high-rise structures that would be visible on the Candlestick Point portion of the site, ranging from 240 feet to a maximum 420 feet in height, with lower-scale development to the west. The high-rise buildings would be prominent, but would not obstruct views of Bayview Hill. Two 32-story towers in Candlestick Point North would be visible east of Bayview Hill. The easterly towers in this view would be on part of the land exchanged with the CPSRA. Conditions would be similar to those with the Project, shown in Figure III.E-16 (View 6: Northeast from US-101 at Harney Way Off-Ramp). The proposed residential development at Executive Park (not a part of the Project), west of Candlestick Point, would be visible against the background of Bayview Hill. The Bay would continue to be visible in the foreground. Bayview Hill would continue as a key visual feature in this view.

As shown in Figure IV-16e (Tower Variant D, View 7: Northeast from San Bruno Mountain), Tower Variant D would introduce high-rise buildings, ranging from 240 feet to a maximum 420 feet in height, at Candlestick Point, and views of the 49ers Stadium, the new marina, and two towers up to 240 feet to 370 feet high at HPS Phase II. Two 32-story towers in Candlestick Point North would be visible east of Bayview Hill. From this viewpoint, the Tower Variant and the Project would have similar effects, as shown in Figure III.E-17 (View 7: Northeast from San Bruno Mountain). The panoramic view of the Bay would still be held from this viewpoint. The shoreline of CPSRA would be visible as the foreground.

Figure IV-16f (Tower Variant D, View 9: North from CPSRA South of Harney Way) is a short-range view from CPSRA towards Candlestick Park stadium, the upper sections of which are visible in the existing setting. The planted areas in the foreground are within the CPSRA. With Tower Variant D and the Project, Candlestick Park stadium would be demolished and residential towers would be visible. From this location in the western part of CPSRA, short- and mid-range views of the stadium would be replaced with Tower Variant development, including the additional 24-story tower at Candlestick Point Center, and the 31-story (reduced from 37 stories) towers in Candlestick Point South. Compared to Project conditions viewed at this location, as shown in Figure III.E-19 (View 9: North from CPSRA South of Harney Way), Tower Variant D would include views of more new development. From other locations in CPSRA, however, views of new development would be reduced, because one tower would be relocated farther away from CPSRA, and three towers adjacent to CPSRA would be reduced in height by three to six stories.

As shown in Figure IV-16g (Tower Variant D, View 11: Northwest from CPSRA), the Tower Variant would introduce residential towers and other structures at Candlestick Point, as seen beyond the shoreline of the CPSRA, and would obstruct the view of portions of Bayview Hill. West of Candlestick Point, existing and approved residential development at Executive Park would be visible. The Candlestick Point towers, including the additional 24-story tower at Candlestick Point Center, and the 31-story (reduced from 37 stories) towers in Candlestick Point South, ranging from 220 feet to a maximum 420 feet in height, would be a substantial change in the existing low-scale pattern in this view, and would block distant views of neighborhoods to the north. The shoreline of CPSRA would be visible as the foreground. As with Project conditions viewed at this location, shown in Figure III.E-21 (View 11: Northwest from CPSRA), Tower Variant D would include views of new development clustered near Bayview Hill. Views of Candlestick Point development to east would also be similar with Tower Variant D and the Project. The larger, 12,500-square-foot maximum floor sizes with Tower Variant D would be apparent in this view, compared to the 10,500-square-foot maximum floor sizes with the Project; the overall change in views would be similar.

Figure IV-16i (Tower Variant D, View 12: Southeast from Gilman Avenue) shows the residential streetscape on Gilman Avenue looking southeast toward the Candlestick Point site. Tower Variant D would introduce two buildings up to 320 feet in height on the north side of Gilman Avenue visible in the distance. The Project would also have two towers at that location; Tower Variant D would increase the height of one tower closer to the viewpoint from 22 stories to 32 stories. As with the Project, the Tower Variant would include roadway and streetscape improvements, also illustrated in Figure IV-16h. Compared to Project conditions viewed at this location, as shown in Figure III.E-22 (View 12: Southeast from Gilman Avenue), Tower Variant D would have more limited views of 31-story (reduced from 37 stories) towers in Candlestick Point South.

Figure IV-16j (Tower Variant D, View 16: Southwest from Mariner Village) shows a view south from Mariner Village on LaSalle Avenue on Hunters Point Hill. The existing foreground includes undeveloped areas of the Shipyard south of Crisp Road. The existing buildings south of Crisp are UCSF facilities that are not part of the HPS Phase II site. With Tower Variant D, Candlestick Point towers, ranging from 220 feet to 420 feet in height, would be a substantial change in the existing low-scale pattern in this view. The shoreline of CPSRA would be visible as the foreground. Other Candlestick Park development would be visible to the north and on Jamestown Avenue at the base of Bayview Hill. The view would also include the Yosemite Slough bridge, improved open space at HPS Phase II, and buildings on Crisp Road. Compared to Project conditions viewed at this location, as shown in Figure III.E-26 (View 16: Southwest from Mariner Village), Tower Variant D would have similar effects.

Figure IV-16h (Tower Variant D, View 17: Northeast from CPSRA) includes the Bay in the foreground and existing buildings at the Shipyard. Views of Tower Variant D development at the Shipyard would include 49ers Stadium, the new marina, and Research & Development buildings. A residential tower, up to 370 feet in height, would be visible beyond the stadium. As noted in the description of Tower Variant D, above, the only change at HPS Phase II would the maximum 12,500-square-foot residential tower floor sizes, compared to the 10,500-square-foot maximum floor sizes with the Project. As shown in this view, the change in floor sizes with Tower Variant D would not alter visual conditions compared with the Project, illustrated by Figure III.E-27 (View 17: Northeast from CPSRA).

Figure IV-16k (Tower Variant D, View 19: East from Hunters Point Hill Open Space) shows a view from open space on Northridge Road on Hunters Point Hill towards the southeast. Tower Variant D would replace the existing structures in the mid ground with mid-rise and two residential towers, up to 270 feet to 370 feet in height. New open space at the Shipyard would be visible at the base of the hill. To the south, the approved HPS Phase I development, not part of the Project and currently under construction, would be visible. As noted in the description of Tower Variant D, above, the only change at HPS Phase II would the maximum 12,500-square-foot residential tower floor sizes, compared to the 10,500-square-foot maximum floor sizes with the Project. As shown in this view, the change in floor sizes with Tower Variant would not alter visual conditions with the Project in Figure III.E-29 (View 19: East from Hunters Point Hill Open Space).

Development of a Tower Variant would not have a substantial adverse effect on a scenic vista. The relocation of a residential tower would not substantially modify views of the Project vicinity, block views of scenic resources across the Project area, or substantially alter or degrade the scenic quality of a view. Impacts would be less than significant.

Development of a Tower Variant would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting. As the footprint of development would be the same as the Project, impacts would be less than significant, similar to the Project.

- Development of a Tower Variant would not substantially degrade the existing visual character or quality of the site or its surroundings. Each of the Tower Variants would change the heights of some the towers or relocate up to five towers. Tower Variant D would have a maximum 12,500-square-foot residential tower floor size, compared to the 10,500-square-foot maximum floor size with the Project. The Tower Variants' effects on visual character would vary from Project effects, with more potential clustering of towers in Candlestick Point, and changes in visibility of some towers from locations in CPSRA. The change in tower floor sizes would not change the visual effects at HPS Phase II, compared with the Project. The Tower Variants, as with the Project, would have a less-than-significant effect on aesthetics, visual character, scenic resources, or scenic vista, As discussed in Section III.E, Draft EIR pages III.E-56 to -57, overall, development of the Project would not block publicly accessible views of the Bay or other scenic vistas. Public access areas, both City and State parks, would maintain views from the Project site toward the East Bay and the Bay. While development of the Project would include several high-rise towers, these towers are not clustered, and would not substantially obstruct, alter, or degrade the quality of views of the Bay or beyond from any long-range viewpoints.

  Thus, the overall change in visual effects compared to existing conditions with the Tower Variants would be as described for the Project effects in Section III.E (Aesthetics). The Tower Variants would have less-than-significant impacts on scenic vistas, scenic resources, and visual quality.

  As with the Project, a Tower Variant would create new sources of light, including light emanating from parking areas and the 49ers stadium, which could be obtrusive in nearby residential areas. Each of the new residential towers would require appropriate operational and security lighting that could result in a greater overall number of lighting sources than the Project. These lighting sources would be consistent with those anticipated with the Project, as well as those existing in an urban, developed area. Mitigation measures MM AE-7a.1 through MM AE-7a.4, MM AE-7b.1, and MM AE-7b.2 would reduce lighting impacts to less than significant for this variant.

Shadows

- A Tower Variant would include one additional residential tower and could change the location of one to three towers, depending on the Variant. The introduction of a new tower, the increased or decreased height of some towers, the change in maximum floor sizes from 10,500 square feet to 12,500 square feet, and the changed location of some towers would modify shadow impacts compared to the Project effects.

Construction

As with the Project, construction activities of the Tower Variant would not result in shadow effects on open space.

Operation

Development of a Tower Variant would result in new structures over 40 feet in height ranging up to 420 feet in height and would extend well above surrounding buildings and cast shadows on nearby public open spaces. Tower Variant A would add ten stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower, as shown in Figure IV-14. Three other residential towers at Candlestick Point South would have three to four fewer floors. Tower Variant B would have an additional 24-story residential tower at Candlestick Point Center. One 17-story tower at Candlestick Point North would be removed as shown in Figure IV-15. Three other towers at Candlestick Point South would have would have two to four fewer floors. Tower Variant C would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variant B, as shown in Figure IV-16. Tower Variant C would also add ten stories to one of the 22-story residential towers at Candlestick Point North, as with Tower Variant A, resulting in a 32-story residential tower; one 17-story tower and one 22-story at Candlestick Point North would be removed and at Candlestick Point South, one tower would have would have two fewer floors and one would have six fewer floors. Tower Variant D would reduce one 37-story tower to 31 stories, or six fewer floors, in Candlestick Point South; one 27-story residential tower at Candlestick Point South would be lowered to 24 stories, or three fewer floors; and one 32-story tower would be relocated from Candlestick Point South to Candlestick Point North. This Variant would add 10 stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower, as with Tower Variants A and C; one 22-story tower and one 17-story tower would be relocated within Candlestick Point North; one residential tower at Candlestick Point North and one residential tower at Candlestick Point South would be lowered to 24 stories, or three fewer floors, as with Tower Variant A. This Variant would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variants B and C. This Variant would have 12 towers at Candlestick Point, compared to 11 towers with the Project.

Project plans have identified the locations of towers, but tower designs are preliminary. The length and duration of shadows cast would be influenced by elements of building design, such as building height, shape, massing, and setbacks. Potential impacts to shade-sensitive locations, such as parks and open space, would be influenced by the location of shade-sensitive uses within the parks and open spaces. The increase in height of one residential tower, from 220 to 320 feet (per Variant A, Variant C, and Variant D) and the inclusion of one new residential tower (with a height of 240 feet) and the relocation of towers (per Variant B, Variant C, and Variant D), would increase potential shading impacts on existing parks and open spaces—Gilman Park—and proposed parks and open spaces—Candlestick Point Neighborhood Park; Bayview Gardens/Wedge Park; and Mini Wedge-Park—and in CPSRA areas near the additional towers. The Tower Variants would also remove one or two residential towers (per Variant B and Variant C), and would reduce the number of stories on up to three towers (all Tower Variants).

As discussed in Section III.F (Shadows), *Planning Code* Section 295 prohibits the issuance of building permits for structures over 40 feet in height that would cast shade or shadow on property with the jurisdiction of, or designated to be acquired by, the Recreation and Park Commission between one hour after sunrise to one hour before sunset at any time of year, unless the Planning Commission determines that the shade or shadow would have an insignificant adverse impact on the use of such property.

As required by *Planning Code* Section 295, the Recreation and Park Commission and the Planning Commission have adopted criteria for the review of shadow effects. For parks for which "shadow budgets"

have not been adopted, the current criteria allow an additional new shadow budget of 0.1 percent for parks larger than 2 acres with annual shadow loads between 20 and 40 percent, expressed in available square-foot-hours of sunlight compared to square-foot-hours of shade. For larger parks with existing shadow loads less than 20 percent, an additional new shadow budget of 1.0 percent would be allowed. The increase is based on calculations of the "Annual Available Sunlight" (AAS) for that park, expressed in square-foot-hours of sunlight (during each day an hour after sunrise to an hour before sunset summed over the course of a year, ignoring shadow from any surrounding structures, and from clouds, fog, and solar eclipses). The shadow impact of the Project is defined as the shadow in square-foot-hours cast by the Project divided by the AAS, expressed as a percentage.

To evaluate potential effects, a shadow modeling study of Tower Variants C and D was completed by CADP, Inc.[1268] Figure IV-17 (Candlestick Point: Tower Variant C Year-Round Shadow Trace) and Figure IV-17a (Candlestick Point: Tower Variant D Year-Round Shadow Trace) are the "shadow fan" or "shadow trace" identifying the maximum extent of all Project-related shadows from one hour after sunrise to one hour before sunset over an entire year, which is the time period specified in *Planning Code* Section 295. The year-round shadow trace is further over-inclusive in that it includes shadow from all buildings within the Project site, including those that would not exceed 40 feet in height and, therefore, would not be subject to the requirements of Section 295. The shadow trace shows that Tower Variant C and Tower Variant D, compared to the Project plans, would shade Gilman Park during the hours specified in Section 295. (As discussed in Section III.F, the Project would add shadows to Gilman Park, but those effects would be from potential 40-foot-high Project buildings south of the park, which are not considered to be adverse effects under Section 295.)

Gilman Park, at 4.4 acres, is a larger park without an adopted shadow budget, and an existing shadow load of less than 20 percent. Therefore, under Section 295, an annual increase of 1.0 percent would be permitted and would not be considered to create a significant effect on the park.

The CADP study also evaluated the Tower Variant C and Tower Variant D effects on Gilman Park with respect to AAS. CADP used computer models to calculate the net increase in square feet, and square-foot-hours, of shade on the park, from one hour after sunrise to one hour before sunset, at 15-minute intervals, at one-week increments, for six months of the year. The calculations are converted to a total annual increase in square-foot-hours of shade, compared to total theoretical square-foot-hours of sun in the park. Because the streets adjacent to the park are bounded by parking lots and low-rise buildings, the analysis conservatively assumed there is no existing shadow load on the park, and that the Tower Variant effects would be net new conditions. The analysis also does not account for existing shading from trees or the service building within the park. On the basis of available observations of Gilman Park, the park is used during mid-day and afternoon periods, by neighborhood residents, and students at adjacent Bret Harte Elementary School. The park is relatively less patronized in morning hours.

[1268]This shadow analysis evaluated Tower Variant C and Tower Variant D, which would include a 24-story tower at a location near Gilman Park, up to three relocated towers and the additional stories on a tower at Candlestick Point North. Variants C and D would have the greatest differences in increased shadow effects, compared to those with the Project. Tower Variant D would have floor sizes with a maximum of 12,500 square feet, compared to 10,500-square-foot maximum floor sizes with the Project. (CADP, Inc., Gilman Park Shadow Calculations, Variant C, October 2009; CADP, Inc., Gilman Park Shadow Calculations, Variant D, March 2010.)

SOURCE: Lennar Urban, RHAA, CADP, 2009.

PBS&J 10.31.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT: TOWER VARIANT C YEAR ROUND SHADOW TRACE

FIGURE IV-17

SOURCE: Lennar Urban, RHAA, CADP, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT: TOWER VARIANT D YEAR-ROUND SHADOW TRACE

FIGURE IV-17a

Tower Variant C and Tower Variant D would shade a portion of Gilman Park from morning to mid-day periods throughout the year, in the first three to four hours after the sunrise plus one-hour cutoff specified by Section 295.[1269] There would be no new shadow from the Tower Variant after about 12:30 P.M. on any day of the year. The effects would vary by season. On June 21, new shadow would occur between about 6:45 A.M. PDT (1 hour after sunrise), and would cover about 21 percent of the park to about 9:45 A.M. on less than 1 percent of the park. On September 21 and March 21, new shadow would occur between about 8:00 A.M. PDT (1 hour after sunrise), on about 32 percent of the park, to about 11:30 A.M., on less than 1 percent of the park. On December 21, new shadow would occur between about 8:00 A.M. PST (1 hour after sunrise), on about 54 percent of the park (Tower Variant C) or 44 percent (Tower Variant D), to about 12:15 P.M. on less than 1 percent of the park. Overall, while those effects would occur for up to four hours after the sunrise plus one-hour cutoff time, in spring, summer, and fall months, the new shade would affect 10 percent or less of Gilman Park by 9:00 A.M. or earlier. In December, the new shade would affect 10 percent or less of Gilman Park by about 10:15 A.M.

Figure IV-18 (Gilman Park—Existing Conditions) is an aerial view showing existing features of Gilman Park. Figure IV-19 (Gilman Park: Tower Variant C Shadows—November 29 [8:05 A.M.]) and Figure IV-20 (Gilman Park: Tower Variant C Shadows—December 20 [8:20 A.M.]) illustrate Tower Variant C shadow at periods of maximum shadow impact, at one hour after sunrise in late fall and winter. Figure IV-20a (Gilman Park: Tower Variant D Shadows—November 8 [7:45 A.M.]) and Figure IV-20b (Gilman Park: Tower Variant D Shadows—December 20 [8:20 A.M.]) illustrate Tower Variant D shadow at periods of maximum shadow impact, at one hour after sunrise in late fall and winter.

Gilman Park is 191,631 square feet (4.4 acres). Tower Variant C would add approximately 21,847,927 new annual square-foot-hours of shadow to the potential of approximately 696,493,920 square-foot-hours of sun, increasing shade square-foot-hours by 3.1 percent. Tower Variant D would add approximately 21,666,526 new annual square-foot-hours of shadow, also increasing shade square-foot-hours by 3.1 percent. This would be greater than the 1.0 percent permitted as new shadow on parks larger than two acres with existing shadow loads less than 20 percent, under current Planning Department criteria.

Therefore, the Tower Variant would add shadows to Gilman Park during the hours between one hour after sunrise and one hour before sunset, with a new shadow load greater than 1.0 percent. This new shadow could have an adverse effect on the use of park. While Tower Variant A would not add shade after late morning or midday periods at any time of year, and the park would not be affected in afternoon periods of use, the shadow effect is conservatively considered to be a significant and unavoidable impact of Tower Variants C and D.

As with the Project, the Tower Variants would shade an area of Bayview Park, owned by the SFRPD, that does not provide any active uses and is relatively steep. The Tower Variants would only shade Bayview Park during the first hour after sunrise in spring, summer, and fall months, and would not create any new shadow by 10:00 A.M. at any time of year. This would not be considered a significant adverse shadow impact on SFRPD open space.

[1269] The sunrise plus one hour cutoff on days when the Tower Variant would cast a shadow on the park would range from about 6:50 A.M. PDT on June 20 to about 8:15 A.M. PST on December 20.

SOURCE: PBS&J, 2009.

PBS&J 10.31.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK — EXISTING CONDITIONS

FIGURE IV-18

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK: TOWER VARIANT C SHADOWS—NOVEMBER 29 (8:05 AM)

FIGURE IV-19

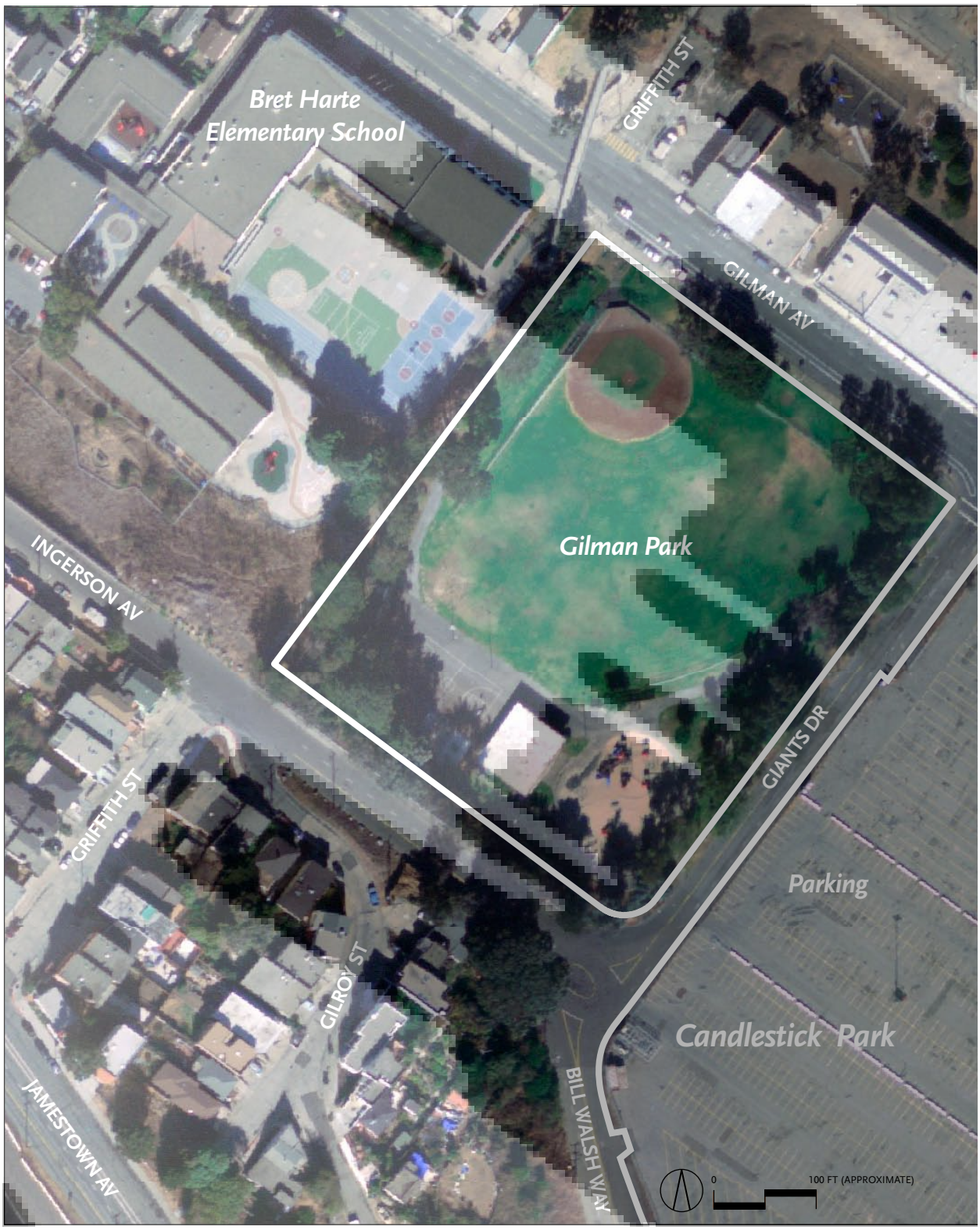
SOURCE: Lennar Urban, RHAA, CADP, 2009.

PBS&J 10.31.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK: TOWER VARIANT C SHADOWS—DECEMBER 20 (8:20 AM)

FIGURE IV-20



SOURCE: Lennar Urban, RHAA, CADP, 2010.

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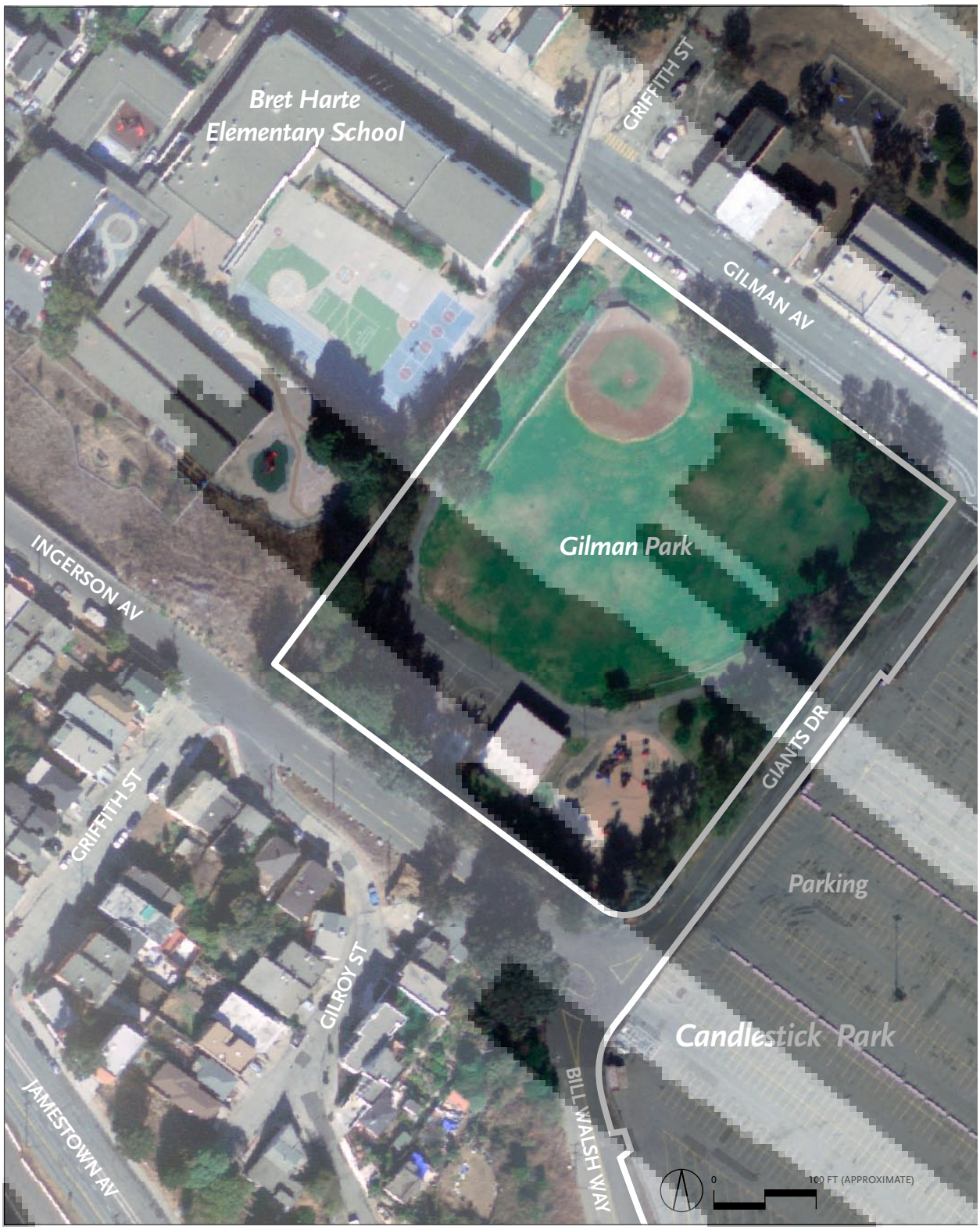
Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK: TOWER VARIANT D SHADOWS — NOVEMBER 8 (7:45 AM PST)

FIGURE IV-20a



SOURCE: Lennar Urban, RHAA, CADP, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-20b

GILMAN PARK: TOWER VARIANT D SHADOWS — DECEMBER 20 (8:20 AM PST)

Tower Variant effects on shadows on the CPSRA would be similar or slightly reduced compared to the Project depending upon the variant: towers near the CPSRA would be three to six stories shorter.

As with the Project, the CPSRA would be affected by new shade in the afternoons, but most areas would experience limited to no new shadow from the Project. Other areas of the CPSRA would largely continue to remain in sun throughout the year. Tower Variant D shadow would not interfere with the public's use or enjoyment of the CPSRA. Activities in these areas, such as windsurfing launching, walking, jogging, and fishing, would not be affected by the new shade.

Shadows cast by Tower Variant D, as with the Project, on proposed new neighborhood parks at Candlestick Point throughout the year would range from little or no shading to large areas of certain parks receiving new shade, particularly in the late afternoon during the vernal and autumnal equinoxes. The orientation of the relatively narrow Alice Griffith Neighborhood and Mini-Wedge Parks with respect to the path of the sun and the close proximity of Tower Variant buildings along the parks' southwestern boundaries combine to make them most susceptible to new shade. Tower Variant D, because of changes in tower locations and height, would shade different areas of proposed open space compared to the Project effects. Overall, given the heights, layouts, and orientations of the Tower Variant buildings, the neighborhood parks would experience variable levels of shading throughout the day, generally receiving some new shade from morning until noon in spring, summer, and fall with a lesser increase in the afternoons in winter, spring, and fall. Public use of these proposed new parks would not be expected to be adversely affected by the shade conditions.

Tower Variant D would not change any tower locations or heights at HPS Phase II; the two residential towers at HPS Phase II would have floor sizes with a maximum of 12,500 square feet, compared to 10,500-square-foot maximum floor sizes with the Project. Shadow effects at HPS Phase II with this change in tower dimension would be similar to the Project and would be less than significant, as shown Figure III.F-15 (Hunters Point Shipyard Phase II: Proposed Project Year-Round Shadow Trace) through Figure III.F-27 (Hunters Point Shipyard Phase II: Shadow Patterns—September 21 [3 PM PDT]) for shadow conditions at HPS Phase II with the Project at 10:00 A.M., noon, and 3:00 P.M. Pacific Standard Time (PST) on December 21 and March 21, and Pacific Daylight Time (PDT) on June 21 and September 21, and discussed on pages III.F-26 through -40 of the Draft EIR.

With appropriate design of the proposed parks and open space, to minimize the installation of shade-sensitive uses at locations that would receive the greatest amount of shading, adverse shadow impacts would be minimized, and Tower Variant impacts to proposed new parks would be less than significant.

Wind

Each of the Tower Variants would change the location of a residential tower between 24 and 32 stories in height (depending on the Variant). As these towers would exceed 100 feet in height, these residential towers have the potential to result in pedestrian wind impacts, as discussed below. In addition, as the location and or height of residential towers would change, this would modify the location of pedestrian wind impacts.

Construction

Construction activities of the Tower Variants would not result in additional wind impacts, and would be similar to the Project. Impacts such as fugitive dust emissions and erosion from wind are addressed in Section III.H and Section III.M.

Operation

Because of their height, the residential towers would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open spaces. Similar to the Project, the street grid with a Tower Variant would not align directly with predominant west and west-northwest wind directions, which would reduce potentially significant pedestrian-level wind acceleration. Due to the location and height of the residential towers with all Tower Variants, a Tower Variant could affect pedestrian-level wind conditions in proposed parks—Candlestick Point Neighborhood Park; Bayview Gardens/Wedge Park; and Mini Wedge-Park—and in CPSRA areas near the towers. The potential pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. However, although the Tower Variant plans have identified the potential locations of the additional towers, tower designs are preliminary, and thus a more detailed analysis of the potential for building design to generate pedestrian-level wind impacts is not feasible at this time.

- As with the Project, all four Tower Variants would have the potential to create potentially significant pedestrian-level wind impacts that exceed the identified threshold of 26 miles per hour (mph) equivalent wind speed for a single hour of the year. Implementation of mitigation measure MM W-1a (wind modeling), which would require a wind analysis for buildings greater than 100 feet in height, and if determined to be necessary, would require inclusion of a design criteria to reduce pedestrian-level impacts below the threshold, would reduce impacts to a less-than-significant level, similar to the Project.

Air Quality

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, air quality impacts of a Tower Variant would also be the same as the Project.

Construction

As stated above, overall construction impacts of the Tower Variant with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre Tower Variant site over the approximately 20-year build-out period ending in 2029, with the construction of the additional dwelling units occurring between 2017 and 2021. Similar to the Project, construction activities under the Housing Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

With respect to construction emissions, construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[1270] Any project within the City of San Francisco, including the Housing Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, impacts from the Tower Variant would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the Tower Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1271] that evaluated potential human health risks associated with construction and operation of the Project. As construction emissions associated with the Tower Variant are expected to be the same as those associated with Project, the Tower Variant would have the same impacts than the Project, would not exceed the BAAQMD CEQA threshold. As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the Tower Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the Tower Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the Tower Variant. This impact is less than significant with MM HZ-15, similar to the Project.

[1270] BAAQMD. 1999. *BAAQMD CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*. December.
[1271] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II.

Operation

The level of emissions anticipated with Tower Variant would be the same as the Project; as such impacts to regional and local air quality would be substantially similar to the Project.

Both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Tower Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. Tower Variant's transportation analysis estimates that a similar development that did not include the trip reduction features of the Utilities Variant would generate 137,282 daily external motor vehicle trips (about 76 percent more than Utilities Variant's daily external motor vehicle trips). Refer to the discussion of Project-related emissions in Section III.H for further clarification.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated with Tower Variant would be expected to exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce Tower Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

With respect to airborne human health risks, emissions associated with operation activities under the Tower Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$).

This Tower Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1272]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. As the Tower Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.7. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the

[1272] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the Tower Variant.

- In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways for the Tower Variant (Variant 3) would remain unchanged from the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations from traffic associated with the Tower Variant (Variant 3) were estimated at selected roadways and compared against the 0.2 μg/m3 action level to determine the potential health risks on receptors attributed to vehicle emissions from the Tower Variant (Variant 3).

  Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

  - Third Street
  - Innes Avenue/Hunters Point Boulevard/Evans Avenue
  - Palou Avenue
  - Gilman Avenue/Paul Avenue
  - Harney Way
  - Jamestown Avenue
  - Ingerson Avenue

- With the addition of Variant-related traffic, no receptors along the streets listed above would experience an increase in $PM_{2.5}$ concentrations in excess of the 0.2 $\mu g/m^3$ action level.[1273],[1274] Concentrations would not exceed the action level, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, noise impacts of a Tower Variant would also be the same as the Project.

Construction activities for a Tower Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and

[1273] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, May 4, 2010.

[1274] ENVIRON, *Updated Air Quality Analysis, Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Updated Variants 2A and 3D, Alternative 2, and Subalternative 4A*, April 26, 2010.

MM NO-1a, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Tower Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Tower Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Tower Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Tower Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Football games and concerts at the proposed stadium with a Tower Variant would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measure MM NO-7.1 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 45 dBA; however, as with the Project, the feasibility and practicality of mitigation measure MM NO-7.1 cannot be determined at this time, this impact would remain significant and unavoidable.

The Tower Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Tower Variant does not include an aviation component. Therefore, a Tower Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the tower foundation. As such, impacts anticipated for Cultural Resources

including paleontological, archaeological, and historical resources as a result of construction of a Tower Variant would be similar to the Project.

Similar to the Project, impacts associated with construction of an additional residential tower with a Tower Variant could result in significant impacts to paleontological and archaeological resources or result in the disturbance of human remains interred outside formal cemeteries. Implementation of mitigation measures MM CP-2a (archaeological resources), MM CP-3a (paleontological resources), and MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce construction impacts to archaeological and paleontological resources to a less-than-significant level, similar to the Project.

Construction of the Project was determined to have a significant and unavoidable impact to historic resources due to the proposed demolition of buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility." While a Tower Variant would retain the buildings and structures in the potential Hunters Point Commercial Drydock District, identified in 1998 as eligible for listing in the National Register of Historic Properties (NRHP), development would result in the demolition of buildings that have been determined eligible for the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district. The impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Development of an additional residential tower, or a change in the location of residential towers (at Candlestick Point), would not change the effects to historical resources at HPS Phase II. A Tower Variant would be required to implement mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) which would reduce impacts to the extent feasible. However, implementation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce but not avoid the significant adverse impact. As with the Project, the impact on historical resources with a Tower Variant would remain significant and unavoidable.

As the total amount of development and footprint of development with a Tower Variant would be the same as for the Project, operation of the Tower Variants would not result in adverse effects to cultural resources, and this impact would be less than significant, similar to the Project.

Hazards and Hazardous Materials

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the tower foundation. As such, impacts from construction of a Tower Variant would be similar to the Project.

Construction activities associated with a Tower Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of

these impacts for a Tower Variant would be the same as the Project and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5a.4).

Construction of a Tower Variants would require improvements to existing utility infrastructure and installation of new underground utilities, which could expose construction workers, the public, or the environment to hazardous materials. With one additional residential tower, a Tower Variant could result in an increase in the amount of excavation and a slightly greater level of ground disturbance and excavation than the Project. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The Tower Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Because an additional tower would be constructed under the Tower Variant, the risk of groundwater contamination would be slightly increased. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the Tower Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the Tower Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before

development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the Tower Variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the Tower Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed in the paragraph above, a Tower Variant would slightly increase in the amount of excavation and ground disturbance, as compared to the Project. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary school are located within one-quarter mile of the development area of the Tower Variants. Consistent with the discussion above, the Tower Variants could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of a Tower Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs, which could expose hazardous materials. As the total amount of development would be the same as the Project, the frequency of maintenance would be the same as the Project. Implementation of mitigation measures MM HZ-1a and MM HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II. Mitigation measure MM HZ-9 also requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

After construction, land uses anticipated under a Tower Variant would involve the routine use, storage, transportation, and disposal of hazardous materials. None of the additional residential towers proposed for inclusion in the Tower Variants would utilize hazardous materials other than routine maintenance and cleaning products typically used in residential and commercial settings. The Tower Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of

hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The Tower Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials. Impacts would be less than significant, similar to the Project.

Hazardous materials would routinely be transported to, from, and within the Project site, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. Compliance with applicable regulations would ensure impacts are less than significant. Since essentially the same amount of development would occur under the Tower Variant and the Project, impacts would be similar to the Project.

Daily operations under the Tower Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but this would not pose a human health risk and/or result in an adverse effect on the environment. Impacts would be less than significant, similar to the Project.

The Tower Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or other airport land use plan, and a Tower Variant would not result in a safety hazard from airport operations for people residing or working in the area. The Tower Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the Tower Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the tower foundation. As such, impacts from construction of a Tower Variant would be similar to the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts from geology and soils would be the same as the Project.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with a Tower Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and

adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, a Tower Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with a Tower Variant would be substantially similar to those of the Project.

The potential for exposure to adverse effects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of a Tower Variant structures and the Yosemite Slough bridge, as required by the SFBC and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for a Tower Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With a Tower Variant, the potential for adverse effects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With a Tower Variant, one or two tower locations would be different than proposed for the Project. Neither of these specific areas is located adjacent to the shoreline such that a Tower Variant could result in impacts greater than those discussed with the Project. Therefore, a Tower Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse effects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Tower Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, a Tower Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse effects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to a Tower Variant structures from expansive soils a less-than-significant level, similar to the Project.

With a Tower Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Tower Variant structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with a Tower Variant.[1275] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with a Tower Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

A Tower Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

[1275] GTC, 2005.

Hydrology and Water Quality

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the foundation of the additional tower. As such, impacts from construction of a Tower Variant would be similar to the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts to hydrology and water quality would be the same as the Project.

Construction

With adherence to applicable regulatory requirements, construction activities associated with a Housing Variant would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With additional excavation for building foundations, impacts would be greater than the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

No streams or rivers are currently located within the Tower Variants area and thus no streams or rivers would be altered by construction activities. During construction of a Tower Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with a Tower Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on site or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated a Tower Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the Housing Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required

by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the footprint of development, land uses, and extent of impervious surfaces would be the same for the Tower Variants as the Project, impacts would be similar to the Project.

Implementation of a Tower Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of a Tower Variant could alter the existing drainage pattern of the site, but would not alter the course of an existing stream or river or result in substantial erosion, siltation, or flooding on-site or off-site, similar to the project. Implementation of a Tower Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of a Tower Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce impacts to a less-than-significant level, similar to the Project.

Implementation of a Tower Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the Tower Variants would not expose people or structures to inundation by seiche, tsunami, or mudflow. Impacts would be less than significant, similar to the Project.

Biological Resources

The footprint of development for a Tower Variant would be the same as for the Project, and the area subject to ground disturbance would be the same as the Project. As such, impacts to Biological Resources from construction of a Tower Variant would also be the same as the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts to biologic resources would also be the similar to the Project.

Construction

Development of a Tower Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

Construction activities under a Tower Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats of fish, wildlife, or birds due to interference with migratory movement. Impacts would be less than significant, and as the same area would be subject to construction activities as the Project, impacts would be similar to the Project.

Construction activities associated with a Tower Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or United States Fish and Wildlife Service (USFWS), and no impact would result, similar to the Project.

Construction activities associated with a Tower Variant could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means. Implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2 would reduce this impact to a less-than-significant level. As the same area would be subject to construction activities as the Project, impacts would be similar to the Project.

Construction activities associated with a Tower Variant could have a substantial adverse effect on eelgrass beds, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. Implementation of mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce this impact to a less-than-significant level, similar to the Project.

Construction activities associated with a Tower Variant could have a substantial adverse effect, either directly or through habitat modifications, on any bird species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Implementation of mitigation measures MM BI-6a.1 and MM BI-6a.2 would reduce this impact to a less-than-significant level, similar to the Project.

Similar to the Project, the Tower Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial.

Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved

construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring.

Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project.

Construction activities associated with a Tower Variant would not have a substantial adverse effect, either directly or through habitat modifications, on the western red bat, a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Impacts would be less than significant and as the same area would be disturbed by construction activities as the Project, impacts would be similar to the Project.

In-water construction activities associated with a Tower Variant would require the removal of hard substrates (docks, riprap, seawalls, pilings, etc.) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species. Impacts would be less than significant, similar to the Project.

Construction activities associated with a Tower Variant would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites. Impacts would be less than significant, similar to the Project.

In-water construction associated with a Tower Variant would not result in the disturbance of contaminated soil or the re-suspension of contaminated sediments that could have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Additionally, construction associated with a Tower Variant would not have a substantial adverse effect on a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. Impacts would be less than significant, similar to the Project.

Development of the Tower Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Tower Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the Tower Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. As all three of the Tower Variants would include one additional residential tower, impacts would be slightly greater than the Project. However, implementation of mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of the Tower Variant would be consistent with the biological resources protection policies of the City of San Francisco General Plan, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Tower Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to a Tower Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of a Tower Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, a Tower Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of a Tower Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of a Tower Variant would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of a Tower Variant construction. As such, since construction of a Tower Variant would be similar to construction of the Project, no impact to school or library services during construction of a Tower Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Development with a Tower Variant would have similar impacts to police protection services as development with the Project. Therefore, since operational impacts to police protection services were found to be less than significant for the Project, impacts to police protection services for a Tower Variant would also be less than significant.

Fire Protection Services

Development with a Tower Variant would have similar impacts to fire services as development with the Project. Therefore, since operational impacts to these services were found to be less than significant for the Project, impacts to these services for a Tower Variant would also be less than significant.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help minimize demand for future fire protection services. Plan review of all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services.

Response Time

Construction of a new SFFD facility on land designated for community serving uses on the Project site, along with the provision of additional firefighters and on-going fire protection operations, would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of a Tower Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Variant. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including

Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1276] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, similar to the Project, the development of a Tower Variant would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is less than significant.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school aged children that would require adequate school services would be the same as with the Project. Impacts from a Tower Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Therefore, the service population for the existing library facilities would be the same as with the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, a Tower Variant would result in a less than significant operational impact to library services, similar to the Project.

Recreation

As the amount of open space and parks, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, impacts to recreation would also be similar to the Project. This Variant, like the Project, would provide approximately 336.4 acres of parks and open space.

Construction impacts related to recreational facilities would be the same as those identified with the Project because the construction activities would be the same. The Tower Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand

[1276] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Tower Variant would be 13.7, which is the same as the Project. The Tower Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

The timing of Tower Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities. The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Tower Variant). As this table indicates, the park-to-population ratio would not drop below 13.8 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Adequate parkland would be provided during each stage of development.

However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Tower Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). Because this Variant is the same as the Project in terms of development amounts and locations, it would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Tower Variant would be substantially similar to the Project.

Utilities

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, utility impacts for a Tower Variant would also be similar to the Project.

Water

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with a Tower Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1277] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1278,1279] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Tower Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

[1277] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.
[1278] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.
[1279] SFPUC, Urban Water Management Plan, 2005.

Wastewater

Wastewater generated by a Tower Variant would be discharged to the Combined Sewer System operated by the SFPUC. As the additional wastewater flows could be accommodated within the existing treatment capacity of those facilities, no expansion of existing wastewater conveyance or treatment facilities would be required and impacts would be less than significant. With the Tower Variant, Candlestick Point would no longer contribute stormwater or wastewater to the Combined Sewer System, similar to the Project. Implementation of a Tower Variant would not exceed the wastewater treatment requirements of the applicable Regional Water Quality Control Board, and a less-than-significant impact would occur. As the same amount of development would occur with a Tower Variant as with the Project, wastewater generation would be the same, and operational impacts associated with wastewater would be less than significant, similar to the Project.

Solid Waste

Construction of a Tower Variant, including demolition of existing facilities, would generate additional solid waste that may not be able to be accommodated by landfills serving the City of San Francisco. Implementation of mitigation measure MM UT-5a (Construction Waste Diversion Plan), which would require preparation of a construction waste diversion plan, would reduce impacts to a less-than-significant level. Construction of a Tower Variant could require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils. However, this construction waste would not exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste, and impacts would be less than significant. As the same amount of construction would occur with a Tower Variant as with the Project, construction-period solid waste impacts would be similar to the Project.

Operation of a Tower Variant would generate additional solid waste that may not be able to be accommodated by landfills serving the City of San Francisco. Implementation of mitigation measure MM UT-7a (Solid Waste Management Plan) would reduce impacts to a less-than-significant level. Operation of a Tower Variant would not generate solid waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste, and impacts would be less than significant. Implementation of a Tower Variant would comply with federal, state, and local statutes and regulations related to solid waste, and impacts would be less than significant. As the same amount of development and the same land uses would occur with a Tower Variant as with the Project, operational impacts to solid waste would be similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into HPS Phase II. This could include a new substation within the Project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Tower Variant, similar to the Project.

Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the Tower Variant, similar to the Project.

Energy

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, energy impacts for a Tower Variant would also be the same as the Project.

Construction activities associated with a Tower Variant would require: electricity, for operation of hand tools, air compressors, mobile project offices, and security lighting; diesel, for fueling grading and construction equipment, delivery trucks, and earth hauling trucks; and gasoline, to fuel construction worker commute vehicles. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, energy consumption associated with construction activities would not be large in comparison to the Project, which is of a similar size and with similar land uses. Impacts would be less than significant, similar to the Project.

Operation of the Tower Variants would result in electricity and natural gas demand to operate the buildings and facilities; and petroleum usage associated with vehicle trips. These uses would increase the use of electricity and natural gas in the area, as well as consumption of petroleum; however, this would not be considered a wasteful use, and overall demand on the electrical grid would not be substantially increased. Impacts of a Tower Variant would result in a less-than-significant impact, similar to the Project.

Greenhouse Gas Emissions

The Candlestick Point Tower Variants A, B, and C would have the same GHG emissions as the project for both construction and operational emissions with the implementation of the mitigation measures. The emissions are shown in Table III.S-2 (Project Construction GHG Emissions) and Table III.S-3 (Project Annual GHG Emissions). Based on the less-than-significant conclusion for the Project, the Candlestick Point Tower Variants would all also be less-than-significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service

population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Tower Variant and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO2e per service population per year and would result in a less-than-significant impact on climate change. The Tower Variant would not measurably change the parameters of the Project land use program, and thus this analysis applies to the Tower Variant.

IV.E VARIANT 4: UTILITIES VARIANT

IV.E.1 Overview

The Utilities Variant assumes the implementation of additional on-site utility infrastructure, including (1) district heating and cooling, (2) on-site wastewater treatment, and (3) an automated trash collection system. All land uses at Candlestick Point and the HPS Phase II site would be constructed at the same locations and at the same intensities proposed with the Project, although some minor shifts in building locations could occur to accommodate some elements of the proposed utility systems, which would require some additional built space.

IV.E.2 Project Objectives

The objectives for the Utilities Variant would be similar to the Project. In particular, the Utilities Variant was prepared to address the following from Objective 4:

- The integrated development should incorporate environmental sustainability concepts and practices, and in so doing should:
  - > Apply sustainability principles in the design and development of public open spaces, recreation facilities, and infrastructure including wastewater, storm water, utility, and transportation systems
  - > Incorporate green building construction practices
  - > Include energy efficiency and the use of renewable energy

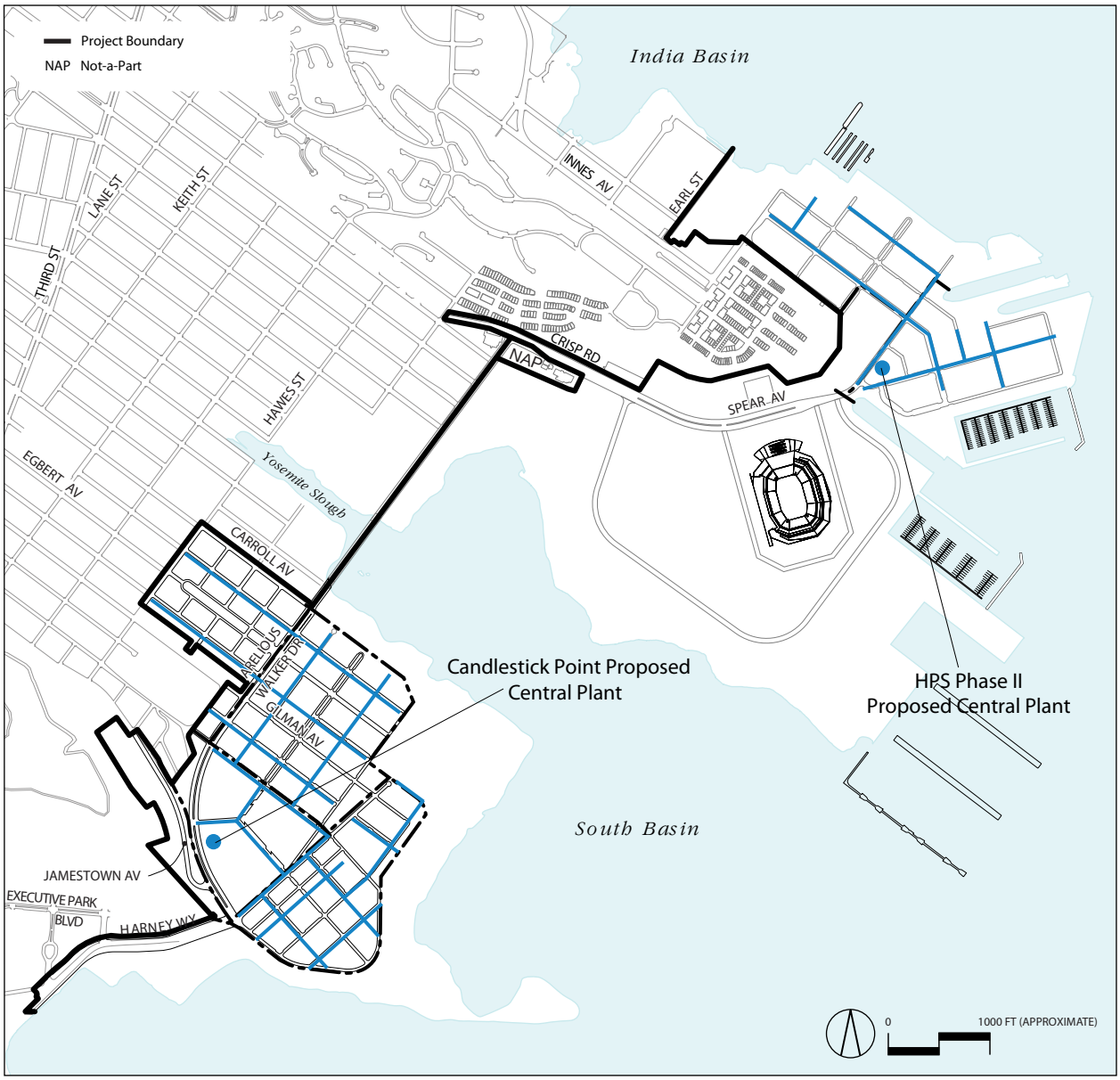
A full list of Project objectives is provided in Section II.D of this EIR.

IV.E.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While each of these components of the Project would also apply to this variant, the additional infrastructure described herein would be in addition to that base description.

District Heating and Cooling

For this variant, heating and cooling would be provided from a centralized plant, instead of individual systems in each building or facility. One heating and cooling (district) plant would serve Candlestick Point and a second district plant would serve Hunters Point, with hot water (or steam) and chilled water distributed from the district plant to individual buildings via a pipe distribution network located under the streets (refer to Appendix T1 [District Plant Description]). The district plant serving Candlestick Point is proposed to be located within the parking structure adjacent to the regional retail center, while the district plant serving Hunters Point is proposed to be located within the parking structure adjacent to the R&D facilities (refer to Figure IV-21 [Utilities Variant Location of District Heating and Cooling Plants]). Each district plant facility would be approximately 40,000 to 65,000 square feet (depending on the



SOURCE: Lennar Urban, 2009.

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FIGURE IV-21

UTILITIES VARIANT LOCATION OF DISTRICT HEATING AND COOLING PLANTS

equipment used), arranged on two floors of approximately 15 to 20 feet high, for a maximum development of approximately 130,000 square feet. The first story would contain the boilers, chillers, pumps and other ancillary equipment. The upper story (or roof) would include exhaust ducts and the cooling towers.

Heating is proposed to be provided by natural gas-fired boilers that could generate either steam or hot water, although the most likely medium for distribution would be low temperature hot water (e.g., less than 250 degrees Fahrenheit). Hot water would be distributed via electrically driven pumping systems in the pipe distribution network. (If steam is used, it would be distributed by taking advantage of the backpressure created as the steam cools, and thus a steam distribution system would not require pumps).

Cooling could be provided by several sources including natural gas-fired, steam-fired, or electrically driven chillers. The most likely and energy-efficient option would be to generate chilled water from multiple electrically driven chillers, with the heat that is extracted from the water (by the chillers) transferred to cooling towers (on the roof) where the heat is exhausted to the ambient air through evaporation.

Based on the land uses and amount of developed space proposed in each district, preliminary estimates of the heating and cooling capacities for each district plant are identified in Table IV-35 (Estimated Heating and Cooling Loads). The peak hot water flow capacity of the district plants would be approximately 5,000 gpm for Candlestick Point and approximately 10,000 gpm for Hunters Point. The peak chilled water flow capacity from the district plants would be approximately 25,000 gpm for Candlestick Point and approximately 30,000 gpm for Hunters Point.

Table IV-35 Estimated Heating and Cooling Loads

Load Type	*Candlestick Point*	*HPS, Phase II*	*Totals*[a]
Heating Load (kBtu/hr)	91,511	184,213	220,579
Cooling Load (tons)	14,090	11,822	20,730

SOURCE: Arup, *HP/CP—District Heating and Cooling Description*, August 20, 2009.
a: Diversity, or increased efficiency, has been applied to the totals.

Each building or customer would be provided with a point of connection to the hot and chilled water distribution loops. This point of connection would include meters from which the energy consumption of each service (heating or cooling) could be determined. Within the individual buildings, piping systems would distribute hot and chilled water to air handling units, which would distribute heated or cooled air to building spaces, based on the preferred air temperature set by occupant-controlled thermostats. (Note that proposed district-based systems would provide heated or cooled air only, as hot water would be generated by individual units.)

On-Site Wastewater Treatment

The Utilities Variant would modify the wastewater treatment system to collect and route wastewater flows to decentralized wastewater treatment plants located throughout the Project site, instead of collecting and conveying wastewater to the Southeast Water Pollutant Control Plant (operated by SFPUC) for treatment. Each decentralized wastewater treatment plant would be sized to accommodate approximately 100,000 gallons per day of wastewater. To accommodate the estimated Project-generated wastewater flow of approximately 1.1 mgd, eleven decentralized wastewater treatment plants would be needed, with seven

plants proposed to be located within Candlestick Park and four in Hunters Point, as shown in Figure IV-22 (Utilities Variant Location of Decentralized Wastewater Treatment Plants).

The wastewater treatment plants would use membrane bioreactors (MBRs) to treat wastewater, via a series of screens, anoxic and aerobic bioreactors (which remove solids and convert nitrogen and ammonia compounds), a membrane filter, and disinfection via exposure to ultraviolet light (refer to Appendix T2 [Decentralized MBR]). Sludge produced by the aerobic bioreactor would be held in a storage tank for periodic collection (e.g., once a week) and transport (via a truck) for recycling, composting, or disposal. The recycled water produced by the treatment plants would be distributed via separate plumbing systems for both exterior (e.g., water features, landscape irrigation) and interior uses (e.g., toilets and urinals). With approximately 1.1 mgd of anticipated wastewater flows, and assuming a 5 percent loss (via sludge disposal), the eleven decentralized plants would generate approximately 1.05 mgd of reclaimed water.[1280]

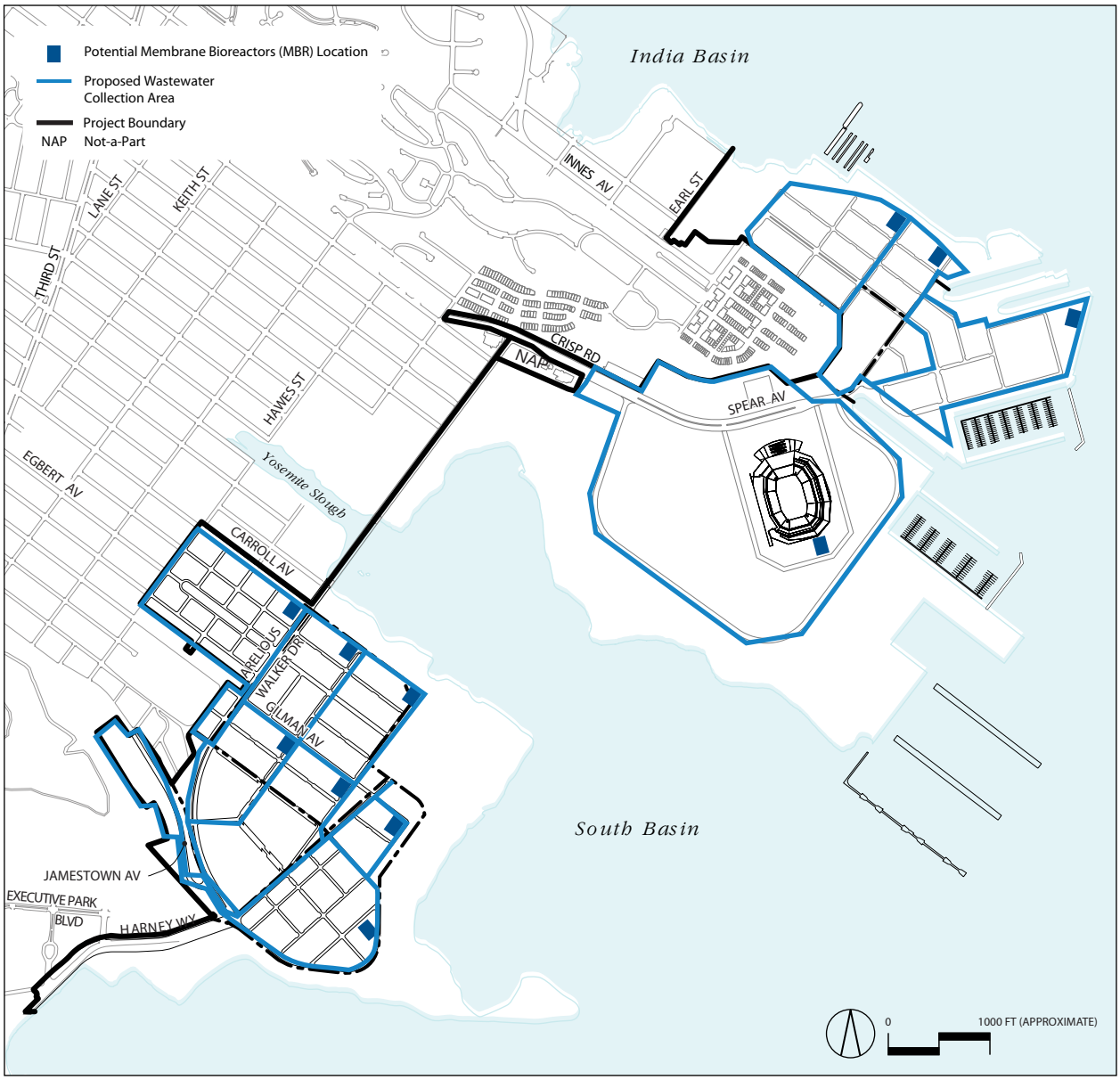
A sludge-holding tank would be used to store sludge, which typically has a water content of about 70 percent, prior to removal. Each wastewater treatment plant would produce about 25 cubic feet or 1,115 pounds (lbs) of wet weight sludge per day. The sludge holding tank would have a storage volume of approximately 175 cubic feet or 6 cubic yards, which could store up to one week of sludge production. Assuming 11 treatment plants, approximately 3,432 cubic yards[1281] of sludge would be generated annually, with a wet weight of approximately 2,238 tons.[1282]

Each wastewater treatment plant would require approximately 6,250 square feet of aboveground footprint to house the treatment plant components, pumps, and chemical storage area. Wastewater, recycled water, and sludge storage tanks could be located below ground (e.g., under parking spaces or driveways) to reduce the footprint of the facility. The estimated belowground footprint requirement for each facility would be approximately 30,000 square feet. Thus, each plant would require approximately 36,250 square feet and the proposed eleven plants would occupy approximately 400,000 square feet.

Automated Trash Collection System

This Variant would provide an automated trash collection system, which would transport trash from individual buildings and collection points and transfer it, via underground pneumatic tubes, to a centralized collection facility, from which solid waste, recyclable materials, and compostable materials would be removed via trucks (refer to Appendix T3 [System Overview]). This automated system would replace the trash and recycling bins at individual buildings with two centralized facilities, one in Candlestick Point and another at Hunters Point (refer to Figure IV-23 [Utilities Variant Location of Centralized Solid Waste Collection Facilities]).

[1280] Arup, MBR Decentralized Wastewater Treatment, EIR Description, August 19, 2009.
[1281] Calculated as 11 treatment plants generating 6 cubic yards per week: 11 plants X 6 yds^3 X 52 weeks = 3,432 yds^3/year.
[1282] Calculated as 11 treatment plants generated 1,115 lbs/day: 11 plants X 1,115 lbs/day X 365 days = 2,238 tons/year.



SOURCE: Lennar Urban, 2009.

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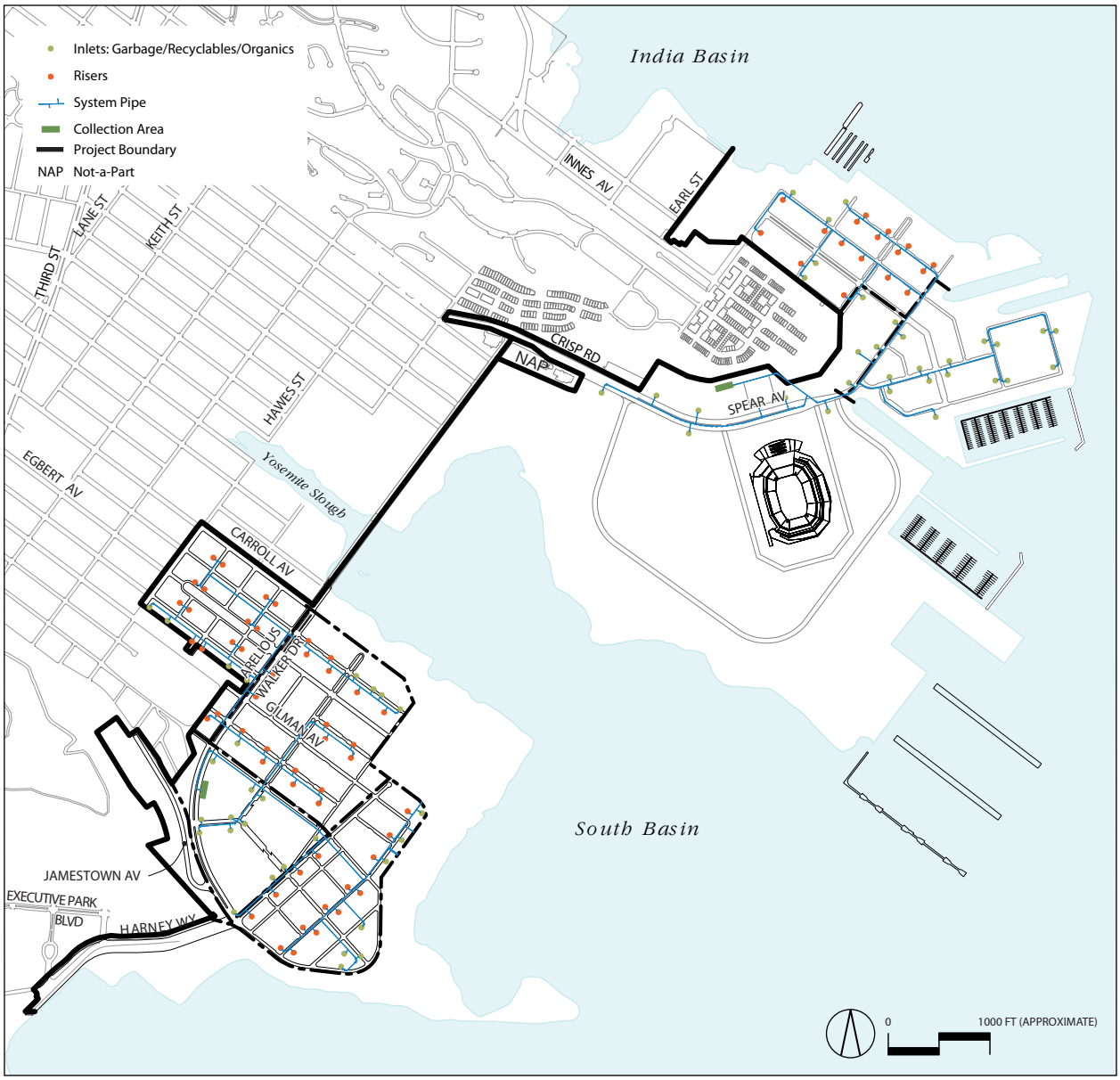
FIGURE IV-22

UTILITIES VARIANT LOCATION OF DECENTRALIZED WASTEWATER TREATMENT PLANTS



SOURCE: Lennar Urban, 2009.

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FIGURE IV-23

UTILITIES VARIANT LOCATION OF CENTRALIZED SOLID WASTE COLLECTION FACILITIES

The proposed automated waste collection system would permit the on-site source separation of recyclables, compostables, and trash, and the introduction of those materials into separate collection points (e.g., trash chutes), which would be located at ground level and on each floor of the multi-story buildings (or in a common area for a group of single-family homes). Once deposited, the material would be temporarily stored at the loading point, and periodically transferred (via an underground pipe network located within roadways) to a central waste handling facility, via a 60 mph air stream within the transport pipes. The discharge of materials into the underground transport pipe network would occur on a regularly scheduled basis, although a sensor in the temporary storage space would initiate the discharge sequence when the level of materials reaches the capacity of the storage space. At the central waste handling facility, each type of material would be deposited into separate containers for compaction before being transported off site via trucks. With this system, solid waste trucks would not visit individual buildings to collect solid waste, recyclable, and compostable materials, but instead would travel to the two centralized facilities to collect these materials.

The two central waste handling facilities would each house fan units, air scrubbers (to minimize odors), cyclone waste separators (to enhance separation of materials), compactors (to reduce the volume of materials), and 40 cubic yard containers. Once filled, the containers would be moved to a staging location within the facility to await removal by truck and an empty container would be quickly moved into place and connected to the compactor. Each central waste handling facility would be approximately 15,000 to 20,000 square feet and about 35 feet in height, for a maximum of approximately 40,000 square feet.[1283] The facilities could be located completely or partially underground, below a building or parking deck. Sound insulation would be provided around the fan and/or collection area to minimize ambient noise from the facility. Air exhaust from the facilities would be scrubbed prior to discharge, by forcing the exhaust air to pass through a screen of water that removes particles and provides odor neutralization. The scrubber water would be filtered and recycled.

IV.E.4 Potential Environmental Effects

Overall, the Utilities Variant would increase the total amount of development compared to the Project due to an increase in the amount of square footage allocated to utilities. Two district heating and cooling plants, approximately 40,000 to 65,000 square feet each, would be developed, reducing the amount of infrastructure that would need to be included within individual buildings. It is assumed that the size of individual buildings would slightly decrease (because less mechanical equipment would be needed), and thus the amount of total new space associated with heating and cooling systems would be essentially the same. The inclusion of decentralized wastewater treatment plants would increase the amount of built space by approximately 400,000 square feet, assuming the inclusion of eleven decentralized MBR treatment facilities, each approximately 36,250 feet in size. However, approximately 30,000 square feet of each facility would be located underground effectively reducing the new development associated with the MBR facilities (from a pedestrian standpoint) to 68,750 square feet.[1284] The inclusion of the automated solid waste collection system would result in the development of two central waste collection facilities, each approximately 15,000 to 20,000 square feet in size, for a total of approximately 40,000 square feet. As these

[1283] TransVac Systems, CP-HPS System Overview, August 18, 2009.
[1284] 6,250 square feet of above ground development for each of the eleven MBR facilities.

facilities would eliminate the inclusion of solid waste receptacles (and compaction equipment) within individual buildings, it is assumed that the total amount of space attributed to the collection, storage and compaction of solid waste could be greater than the more standard methods of collection, such as dumpsters within each building. Thus, this Variant would increase the total amount of built space by approximately 568,750 square feet.

The Utilities Variant would include underground distribution systems such as pipes and pumps, located underneath the streets within the Utilities Variant area, similar to the Project. The number of underground systems would increase with development with this Variant, as hot water, chilled water, and three separate waste collection systems (for solid waste, recyclables, and compostables) would be provided. Storage tanks associated with the decentralized wastewater treatment plants are proposed to be located underground. Compared to the Project, the Utilities Variant would increase the extent of underground construction, with additional underground utility systems located within the street network and storage tanks located beneath the wastewater treatment plants.

Thus, the potential construction-related environmental effects of the Utilities Variant would be related to an increase in the amount of total building space, approximately 568,750 square feet, of which approximately 330,000 square feet would be below-grade, and an increase in the extent of underground construction (from additional utility systems located beneath the street network and the underground storage space for the wastewater treatment plants).

The potential operational effects of the Utilities Variant would be related to operation of district heating and cooling plants, the decentralized wastewater treatment plants, and the automated solid waste collection system.

Land Use and Plans

Development of the Utilities Variant would be substantially similar to the Project and would not physically divide an established community or conflict with plans, policies, or regulations adopted to avoid or mitigate an environmental effect. Operation of the Utilities Variant would alter the existing land use character of the vicinity, but such an alteration would not be adverse, similar to the Project. The Utilities Variant would include approximately 568,750 square feet of additional space, when compared to the Project, to accommodate the heating and cooling plants, the wastewater treatment plants, and the solid waste collection system. Notably, approximately 330,000 square feet of this total would be constructed below ground, thereby reducing potential impacts. Therefore, construction proposed above-ground with the Utilities Variant includes approximately 15 new buildings, the tallest of which would be 35 feet in height, and the largest of which would be approximately 40,000 to 65,000 square feet (the heating or cooling plants). This development is consistent with uses and building characteristics proposed with the Project. Therefore, these additional structures would not result in an adverse change to the land use character of the site or the surrounding areas, and the Utilities Variant would result in a less-than-significant impact, similar to the Project. The Utilities Variant would result in an urban development replacing deteriorating industrial and open space, similar to the Project, and would not conflict with existing land use plans. Thus, potential impacts of the Utilities Variant to land use and plans would be less than significant, similar to the Project.

Population, Housing, and Employment

As discussed in the introduction, the Utilities Variant includes the development proposed with the Project plus the addition of substantial infrastructure, including a subterranean piping network, new heating and cooling towers, new wastewater treatment facilities, and relocated/redesigned solid waste collection facilities. All impacts related to the inducement of substantial population growth (directly or indirectly) were found to be less than significant for the Project. The installation of additional infrastructure to better serve the proposed development would not result in the generation of substantial additional residents or employees in the area, in addition to what is anticipated with the Project. While some additional short-term employment opportunities may be made available during the construction period, these opportunities would be few and placement would be from the surrounding community.

Operation of the Utilities Variant, which would consist of the operation and maintenance of the proposed infrastructure improvements, would not result in the generation of a substantial number of people to the area. While operation of the Utilities Variant could induce population growth directly and/or indirectly, this growth would not be substantial and the Utilities Variant would result in a less-than-significant impact, similar to the Project. As with the Project, the Utilities Variant could temporarily displace existing housing units and residents at Candlestick Point, but construction of replacement housing would not be necessitated elsewhere. Thus, potential population, employment, and housing impacts of the Utilities Variant would be less than significant, and similar to the Project.

Transportation and Circulation

As is considered for the Project, under the Utilities Variant, the installation of additional infrastructure to better serve development would not result in the generation of additional residents or employees in the area that would result in additional traffic. All land uses at Candlestick Point and the HPS Phase II site would be constructed at the same locations and at the same intensities proposed under the Project, although some minor shifts in building locations could occur to accommodate some elements of the proposed utility systems, which would require some additional built space. Therefore, the Utilities Variant would not result in an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, above what was analyzed for the Project. Furthermore, the Utilities Variant would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management plan (CMP) for roads or highways. Generally speaking, transportation impacts associated with the Utilities Variant would be the same as those identified for the Project.

The Utilities Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or near a private airstrip. Therefore, the Utilities Variant would result in a less than significant impact to aircraft activity and traffic levels, similar to the Project.

The Utilities Variant includes the installation of a subterranean piping network, as well as approximately 15 new buildings to house the requisite utility functions. The subterranean development would not affect or increase hazards due to design features or incompatible uses above ground. The new buildings would be designed consistent with the SFBC which would reduce all potential design hazards to a less than significant level. Furthermore, the roadway network associated with both the Project and the Utilities

Variant would be designed to meet all applicable codes, including design guidelines for emergency access, and would result in a less than significant impact due to design hazards, similar to the Project.

The provision of a sophisticated utility system under the Utilities Variant would not substantially increase the number of residents or employees in the area. As such, substantial additional parking, above that considered for the Project, would not be required. Parking at the new buildings associated with the utilities including, but not limited to, the heating and cooling plants, the wastewater treatment facilities, and the solid waste collection facilities would be provided consistent with the requirements of the SFBC. Therefore, the Utilities Variant would result in a less than significant impact to parking, similar to the Project. As the Utilities Variant would not change the roadway design or alternative transportation plans analyzed for the Project, the Utilities Variant would comply with adopted policies and plans regarding alternative transportation and would result in a less than significant impact.

Aesthetics

Construction

Similar to the Project, construction activities associated with the Utilities Variant would generally include demolition (scraping and/or cutting) of existing asphalt and concrete, grading for roadways, roadway improvements, trenching for the proposed underground piping network, and construction of new buildings. Construction activities associated with the Utilities Variant would not have a substantial adverse effect on a scenic vista, scenic resources including, but not limited to, trees and rock outcroppings, or the visual character of the area. Construction activities may be seen from adjacent land uses, similar to the Project; however, these construction conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Therefore, impacts to the visual character of the area would be less than significant, similar to the Project. While construction activities are taking place, appropriate security lighting would be utilized. However, this would be a temporary occurrence and lighting would be removed upon completion of construction. Therefore, the Utilities Variant would not create a new source of substantial light or glare that would adversely affect day or night views in the area or substantially adversely impact other people or properties. Mitigation measures MM AE-7a.1 through MM AE-7a.4, MM AE-7b.1, and MM AE-7b.2 would reduce lighting impacts to less than significant for this variant.

Operation

The Utilities Variant would result in approximately 15 new buildings on site including a variety of heating and cooling plants, wastewater treatment plants, and solid waste collection facilities. However, all of these buildings would have a height no greater than 35 feet. This is consistent with other development in the surrounding urban and developed area. Additionally, this height is consistent with, and lower than, the building heights proposed with the Project. As such, similar to the Project, the Utilities Variant would result in less-than-significant impacts to aesthetics due to the creation of impediments to views. Operation of the Utilities Variant would not remove or substantially block a scenic vista or scenic resources, including but not limited to trees and rock outcroppings. As such, operation of the Utilities Variant would result in less than significant aesthetic impacts, similar to the Project.

The Project would result in the generation of plumes of evaporated water at multiple locations throughout the Project site from the operation of evaporative cooling towers, particularly during cool, damp, or foggy weather. With the Utilities Variant, the plumes of evaporated water resulting from the heating and cooling plants would be consolidated and effectively relocated to two locations, rather than numerous smaller but scattered locations anticipated with the Project. These two new locations include the parking structure adjacent to the regional retail center at Candlestick Point, as well as the parking structure adjacent to the R&D facilities at Hunters Point (as depicted on Figure IV-21). These plumes would be most visible during cool, damp, or foggy weather. However, as clouds or fog would generally be present at those times, the concentration of evaporated water plumes would not substantially degrade the existing visual character or quality of the site and its surroundings, and this impact would be less than significant, similar to the Project.

Similar to the Project, the Utilities Variant would create new sources of light, including light emanating from parking areas and the 49ers stadium, which could be obtrusive in nearby residential areas. Each of the heating and cooling plants (one of each type), wastewater treatment plants, and central waste handling facilities would require appropriate operational and security lighting that could result in a greater number of lighting sources than the Project. However, these sources would not include substantially more (in number) sources than the Project. Furthermore, these lighting sources would be consistent with those anticipated with the Project, as well as those existing in the urban, developed area within which the Project and the Utilities Variant are proposed. Therefore, aesthetic impacts of the Utilities Variant due to new sources of lighting would be similar to the Project. Similar to the Project, implementation of mitigation measures MM AE-7b.1 (test field lighting) and MM AE-7b.2 (avoid spill lighting) would further reduce this impact to a less-than-significant level.

Thus, potential aesthetic impacts of the Utilities Variant would be less than significant, similar to the Project.

Shadows

The Utilities Variant would result in approximately 15 new buildings on site including a variety of heating and cooling plants, wastewater treatment plants, and solid waste collection facilities. However, all of these buildings would have a height no greater than 35 feet. This would be consistent with other development in the surrounding urban and developed area. Additionally, this height would be consistent with, or lower than, the building heights proposed with the Project. As such, the Utilities Variant would result in less-than-significant impacts of shadow effects on existing and proposed open space, similar to the Project,.

Wind

Development of the Utilities Variant would result in development that is similar to the Project, with the exception of 15 structures ranging in height from 15 to 35 feet. As none of these structures would exceed 100 feet in height, none would have the potential to generate winds that could affect pedestrian spaces as ground level. With the incorporation of mitigation measure MM W-1a (Building Design Wind Analysis), impacts would be reduced to a less than significant level, similar to the project.

Air Quality

The Utilities Variant would involve the development of additional on-site utility infrastructure. While construction of centralized utilities would result in a greater amount of development, most of the development would be underground, and the level of overall above-ground development with this alternative would be substantially similar to the Project, as shown in Table IV-1. Construction and operational impacts would be substantially similar to the Project.

Construction

As stated above, overall construction impacts of the Utilities Variant with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre site over the approximately 20-year build-out period ending in 2029 with Utilities Variant. Similar to the Project, construction activities with Utilities Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities. Any project within the City of San Francisco, including Utilities Variant, would be required to comply with San Francisco Health Code Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, construction-related criteria pollutant impacts associated with Utilities Variant would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the Utilities Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human

health risk assessment (HRA)[1285] that evaluated potential human health risks associated with construction and operation of the Project. As construction emissions associated with the Utilities Variant are expected to be the same as those associated with Project, the Utilities Variant would have the same impacts than the Project, would not exceed the BAAQMD CEQA threshold. As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the Utilities Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the Utilities Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the Utilities Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

The level of emissions anticipated with Utilities Variant would be the same as the Project; as such impacts to regional and local air quality would be substantially similar to the Project.

Both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Utilities Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated with Utilities Variant would be expected to exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce Utilities Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

With respect to airborne human health risks, emissions associated with operation activities under the Utilities Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$).

This Utilities Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts

[1285] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II.

from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1286]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. All receptors were initially evaluated as residential receptors. The estimated excess lifetime cancer risks and HIs within areas designated for residential use were found not to exceed the BAAQMD's significance thresholds for carcinogenic and noncarcinogenic health risks. As the Utilities Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.6. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0.

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the Utilities Variant.

In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways for the Utilities Variant (Variant 4) would remain unchanged from the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations from traffic associated with the Utilities Variant (Variant 4) were estimated at selected roadways and compared against the 0.2 $\mu g/m^3$ action level to determine the potential health risks on receptors attributed to vehicle emissions from the Utilities Variant.

Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

[1286] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

- With the addition of Variant-related traffic, no receptors along the streets listed above would experience an increase in $PM_{2.5}$ concentrations in excess of the 0.2 $\mu g/m^3$ action level.[1287] Concentrations would not exceed the action level, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As discussed in the introduction, the Utilities Variant includes the development proposed under the Project plus the addition of substantial infrastructure, including a subterranean piping network, new heating and cooling towers, new wastewater treatment facilities, and relocated/redesigned solid waste collection facilities. As the land uses provided with the Utilities Variant would be the same as the Project, with just the addition of additional utilities within the Project area, noise impacts of a Utilities Variant would also be the same as the Project.

Construction activities for a Utilities Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Utilities Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Utilities Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Utilities Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Utilities Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures

[1287] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, May 4, 2010.

that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Football games and concerts at the proposed stadium with a Utilities Variant would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measure MM NO-7.1 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 45 dBA; however, as with the Project, the feasibility and practicality of mitigation measure MM NO-7.1 cannot be determined at this time, this impact would remain significant and unavoidable.

The Utilities Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Utilities Variant does not include an aviation component. Therefore, a Utilities Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

Construction

The footprint of development with the Utilities Variant would be substantially similar to the Project. As such, impacts anticipated to Cultural Resources including paleontological, archaeological, and historical resources as a result of construction of the Utilities Variant would generally be similar to the Project as well. With the Utilities Variant, additional utility systems would be located beneath the street network. This work would not substantially alter the land surface proposed for traffic and circulation as compared to the Project, and all areas anticipated for streets, sidewalks, and associated roadway infrastructure would already be assumed to be subject to grading and some excavation as part of the Project. The installation of underground storage space beneath the wastewater treatment plants (approximately 30,000 square feet per building) as well as the potential for increased excavation under the heating/cooling plants and solid waste collection facilities, as compared to the Project, would increase the extent of excavation in some locations. Similar to the Project, impacts associated with additional excavation for the Utilities Variant could result in significant impacts to paleontological and archaeological resources or result in the disturbance of human remains interred outside formal cemeteries. However, implementation of mitigation measures MM CP-2a (archaeological resources), MM CP-3a (paleontological resources), and MM CP-1b.1 and MM CP-1b.2 (historic resources) would reduce construction impacts to archaeological and paleontological resources to a less-than-significant level, similar to the Project.

Construction of the Project was determined to have a significant and unavoidable impact to historic resources due to the proposed demolition of buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility."[1288] While the Project proposes to retain the buildings and structures in the potential Hunters Point Commercial Drydock District, identified in 1998 as eligible for listing in the NRHP, development would result in the demolition of buildings that have been determined eligible for

[1288] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.

the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district; the impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. With the Utilities Variant the same impacts would occur due to removal of the same structures discussed above. Installation of the heating/cooling towers, MRP buildings, and solid waste collection facilities, in addition to all associated infrastructure would not alter any additional structures that may be considered to contribute to the district. The Utilities Variant would comply with MM CP-3b (historical resources), which would reduce impacts to the extent feasible. However, the impact would not be fully reduced and the Utilities Variant would result in a significant and unavoidable impact with mitigation to historic resources during construction. This impact would be similar to that identified for the Project.

Operation

Operation of the Utilities Variant would result in less-than-significant impacts to cultural resources, including paleontological, archaeological, and historic resources, similar to the Project.

Hazards and Hazardous Materials

Construction activities associated with the Utilities Variant would disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the Utilities Variant would be similar to the Project and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the Utilities Variant would require improvements to existing utility infrastructure and installation of new underground utilities, including hot and chilled water distribution lines as well as solid waste collection lines, which could expose construction workers, the public, or the environment to hazardous materials. This additional utility work could result in an increase in the amount of excavation and a slightly greater level of ground disturbance and excavation than the Project. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The Utilities Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the Utilities Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the Utilities Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the Utilities Variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the Utilities Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed in the paragraph above, the Utilities Variant includes installation of utilities in addition to that anticipated under the Project. This additional work could result in an increase in the amount of excavation and ground disturbance, as compared to the Project. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the Utilities Variant. Consistent with the discussion above, the Utilities Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the Utilities Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. As the frequency of infrastructure maintenance under the Utilities Variant would likely be greater than the Project based on the increased amount of infrastructure, it is anticipated that the Utilities Variant could result in a slightly greater impact than the Project with respect to potential exposure to hazardous materials. Implementation of mitigation measures MM HZ-1a and MM HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II. Mitigation measure MM HZ-9 also requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

After construction, land uses anticipated under the Utilities Variant would involve the routine use, storage, transportation, and disposal of hazardous materials. None of the systems proposed for inclusion in the Utilities Variant would utilize hazardous materials other than routine maintenance and cleaning products typically used in residential, office and commercial settings. Products containing hazardous materials used in required to address additional square footage anticipated under the Utilities Variant would be incrementally small, and would not substantially increase the risk from handling these materials. The Utilities Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. None of the outputs of the utility systems (hot water, chilled water, recycled water, sludge, solid waste, recyclable materials, and compostable materials) would contain hazardous materials in amounts greater than that which would be utilized under the Project (e.g., if building occupants disposed of small amount of hazardous materials, such as cleaning products, via trash receptacles or if the use of an automated solid waste collection system would not increase or decrease the presence of any such

substances). The Utilities Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. The precise amount of hazardous materials that would be transported to or from the site under the Utilities Variant is difficult to predict accurately at the current time due to the pending selection of tenants for the future retail-commercial stores. However, it is understood that these uses would be consistent with those uses analyzed for the Project and therefore, potential impacts would be similar under this variant to the Project's impacts.

Daily operations under the Utilities Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but this would not pose a human health risk and/or result in an adverse effect on the environment. With increased routine use of hazardous materials compared to existing conditions for Utilities Variant operations, exposure of future occupants, visitors, and employees to hazardous materials could occur by improper handling or use of hazardous materials or hazardous wastes during operation of the Utilities Variant. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could also occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The Utilities Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the Utilities Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The Utilities Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with a Utilities Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the Utilities Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the Utilities Variant would be substantially similar to those of the Project.

The potential for exposure to adverse effects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of the Utilities Variant structures and the Yosemite Slough bridge, as required by the SFBC and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of the Utilities Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for the Utilities Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the Utilities Variant, the potential for adverse effects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the Utilities Variant, additional utility infrastructure would be constructed throughout the Project site. None of these specific areas is located adjacent to the shoreline such that the Utilities Variant could result

in impacts greater than those discussed with the Project. Therefore, the Utilities Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse effects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Utilities Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Utilities Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse effects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to the Utilities Variant structures from expansive soils a less-than-significant level, similar to the Project.

With the Utilities Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to the Utilities Variant structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the Utilities Variant.[1289] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the Utilities Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The Utilities Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

For this variant, heating and cooling would be provided from a centralized plant, instead of individual systems in each building or facility. In addition to the installation of a larger underground piping network than that required of the Project, the Utilities Variant includes the installation of underground storage tanks

[1289] GTC, 2005.

for the decentralized wastewater treatment plants. The Utilities Variant would result in the construction of approximately 30,000 square feet of underground storage space per wastewater treatment building, for a total of approximately 330,000 square feet of underground space. The district plant serving Candlestick Point is proposed to be located within the parking structure adjacent to the regional retail center, while the district plant serving Hunters Point is proposed to be located within the parking structure adjacent to the R&D facilities. All land uses at Candlestick Point and the HPS Phase II site would be constructed at the same locations and at the same intensities proposed with the Project, although some minor shifts in building locations could occur to accommodate some elements of the proposed utility systems, which would require some additional built space. As the footprint of development and the total amount of development would be incrementally greater than the Project, operational impacts to hydrology and water quality would be the substantially similar to the Project.

Construction

Operation of the Utilities Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the Housing Variant would be less than the Project, impacts would be similar and slightly less than the Project.

Development of the Utilities Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge Construction of additional underground facilities could require short- and/or long-term dewatering, which could result in localized lowering of groundwater levels in the vicinity of these underground spaces. However, the approximately 330,000 square feet of underground space represents approximately 1 percent of the total 702-acre site, and a substantial lowering of groundwater levels resulting from short- or long-term dewatering is unlikely. Compliance with mitigation measure MM GE-2 (Mitigation to Minimize Dewatering Impacts during Construction) would ensure that this impact would be less than significant, similar to the Project. As the total amount of open space with the Utilities Variant would remain the same as with the Project, the amount of permeable surface would also remain the same. Therefore, the Utilities Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the Utilities Variant area and, thus, no streams or rivers would be altered by construction activities. During construction of the Utilities Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the Utilities Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on site or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated the Utilities Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the Utilities Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the footprint of development, land uses, and extent of impervious surfaces for the Utilities Variant would be the same as the Project, impacts would be similar to the Project.

The Utilities Variant would modify the wastewater treatment system to collect and route wastewater flows to decentralized wastewater treatment plants located throughout the Project site, instead of collecting and conveying wastewater to the Southeast Water Pollutant Control Plant (operated by SFPUC) for treatment. Each decentralized wastewater treatment plant would be sized to accommodate approximately 100,000 gallons per day of wastewater. To accommodate the estimated Project-generated wastewater flow of approximately 1.1 mgd, eleven decentralized wastewater treatment plants would be needed, with seven plants proposed to be located within Candlestick Park and four in Hunters Point, Therefore, wastewater flows from the Project site would be retained on site and not discharged to the Combined Sewer System.

Implementation of the Utilities Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and this impact would be less than significant, similar to the Project.

Operation of the Utilities Variant could alter existing drainage pattern of the site, but would not alter the course of a stream or river or result in substantial erosion, siltation, or flooding on site or off site. Implementation of the Utilities Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of the Utilities Variant would not place housing and other structures within the proposed 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce impacts to a less-than-significant level, similar to the Project.

Implementation of a Utilities Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the Utilities Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. Impacts would be less than significant, similar to the Project

Biological Resources

The additional subterranean work required under the Utilities Variant (as compared to the Project) for installation of the piping network, and heating/cooling towers, wastewater treatment facilities, and solid waste collection facilities would not increase the potential for impacts to biological resources as the amount of land disturbance, and therefore habitat, would not be increased. The Utilities Variant would generally involve the same amount of ground disturbance, shoreline improvements, and in-water work as the Project. Thus, overall construction-related impacts to biological resources would be similar to the Project. Implementation of the Utilities Variant would result in generally the same amount of development, would preserve the same amount of existing open space, and would create the same amount of new open space as the Project. Thus, operation of the Utilities Variant would result in similar, less than significant impacts to biological resources as the Project. Both construction and operational impacts to biological resources would be similar to the Project, as discussed below, because the type of development and associated construction activities are generally the same.

Construction

Development of the Utilities Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

Development of the Utilities Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats since ecological enhancements and measures to avoid and minimize impacts to common vegetation communities and wildlife species would be proposed, similar to the Project. Impacts would be less than significant, similar to the Project.

Development of the Utilities Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur.

Similar to the Project, the Utilities Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the Utilities Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the Utilities Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would

ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Utilities Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the Utilities Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the Utilities Variant would be consistent with the biological resources protection policies of the City of San Francisco General Plan, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Utilities Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to the Utilities Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program

of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the Utilities Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the Utilities Variant would result in a less-than-significant impact to police protection and fire services during construction, as construction of the Utilities Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Utilities Variant would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the Utilities Variant would be similar to construction of the Project, no impact to school or library services during construction of the Utilities Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Development with the Utilities Variant would have similar impacts to police protection services as development with the Project. Although the Utilities Variant would increase the amount of utility infrastructure and some associated employees, since operational impacts to police protection services were found to be less than significant for the Project, impacts to police protection services for the Utilities Variant would also be less than significant.

Fire Protection Services

Development with the Utilities Variant would have similar impacts to fire services as development with the Project. Although the Utilities Variant would increase the amount of utility infrastructure and associated employees, since operational impacts to these services were found to be less than significant for the Project, impacts to these services for the Utilities Variant would also be less than significant.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help minimize demand for future fire protection services. Plan review of all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services.

Response Time

Construction of a new SFFD facility on land designated for community serving uses on the Utilities Variant site, along with the provision of additional firefighters and on-going fire protection operations, would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the Utilities Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Utilities Variant. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1290] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, similar to the Project, the development of the Utilities Variant would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is less than significant.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school-age children that would require adequate school services would be the same as with the Project. Impacts from the Utilities Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Therefore, the service population for the existing library facilities would be the same as with the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, the Utilities Variant would result in a less than significant operational impact to library services, similar to the Project.

[1290] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

Recreation

The Utilities Variant includes all development proposed with the Project plus the addition of substantial infrastructure including a subterranean piping network, new heating and cooling towers, new wastewater treatment facilities, and relocated/redesigned solid waste collection facilities. The installation of additional infrastructure to better serve the proposed development would not result in the generation of additional residents or substantial additional employees in the area that would result in additional demand on recreational opportunities. As the amount of open space and parks, the total amount of development, and the land uses provided with the Utilities Variant would be the same as the Project (and the same as the Utilities Variant), impacts to recreation would also be similar to the Project. This Variant, like the Project, would provide approximately 336.4 acres of parks and open space.

Construction impacts related to recreational facilities would be the same as those identified with the Project because the construction activities would be the same. The Utilities Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Utilities Variant would be 13.7, which is the same as the Project. The Utilities Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

The timing of Utilities Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities. The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Utilities Variant). As this table indicates, the park-to-population ratio would not drop below 13.8 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Adequate parkland would be provided during each stage of development.

However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Utilities Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). Because this Variant is the same as the Project in terms of development amounts and locations, it would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Utilities Variant would be substantially similar to the Project.

Utilities

As discussed in the introduction, the Utilities Variant includes all development proposed with the Project plus the addition of substantial infrastructure including a subterranean piping network, two heating/cooling plants to provide a more centralized system, eleven individual wastewater treatment facilities, and two central solid waste collection facilities. With the Utilities Variant, upgrades to the individual utility systems are considered for the Project. As such, generally the Utilities Variant would not result in significant impacts that would require the construction of new or expanded facilities to handle projected demand and a less-than-significant impact would result, creating a lesser impact than the Project. Additionally, the Utilities Variant would treat wastewater on site, rather than sending it to the municipal plant for treatment thereby also reducing impacts.

Similar to the Project, with the Utilities Variant, the installation of additional infrastructure to better serve development would not result in the generation of substantial additional residents or employees in the area that would result in additional wastewater generation requiring treatment. Therefore, the Utilities Variant would not require or result in the construction of new or expanded water treatment facilities, the construction of which could cause significant environmental effects, and would result in a less-than-significant impact. Furthermore, the Utilities Variant includes installation of a wastewater treatment system, including 11 decentralized facilities to handle all treatment demand. With the Utilities Variant, all wastewater treatment would be handled on site rather than conveying the water to the SFPUC, as is done currently. This would relieve the SFPUC of treatment of approximately 1.05 mgd, creating a beneficial effect on wastewater treatment, compared to the Project. Construction activities would include replacement of existing wastewater conveyance lines within the area and new decentralized wastewater treatment facilities. Impacts related to these construction activities would be less than significant, generally similar to the Project.

Water

While operation of the Utilities Variant would not generate additional population (residents or employees, permanent or temporary), operation of the proposed utility system would increase water demand. Although the piping network would be substantially larger with the Utilities Variant, much of this is to convey solid

waste and would not increase water demand. However, operational activities of the two heating/cooling plants, the eleven wastewater treatment plants, as well as the two solid waste collection facilities would increase water usage. It is important to note that this operational water demand for utilities would effectively be shifted within the existing area-wide water usage because existing utility service provider(s) would otherwise be handling the associated heating/cooling distribution, wastewater treatment, and solid waste collection for the site and would require water during their operations. These utility operations are being shifted "on site" away from the existing service providers with the Utilities Variant and effectively, the water demand is being shifted as well. Little, if any, additional water demand would be placed on the water system at an areawide level to provide these services. Therefore, the Utilities Variant would not require water supplies in excess of existing entitlements and resources or result in the need for new or expanded entitlements and would result in a less-than-significant impact. Additionally, as discussed above, with the Utilities Variant, treatment at the decentralized wastewater treatment facilities would produce approximately 1.05 mgd of recycled water, and total water demand would be reduced by an equivalent amount. Thus, the water demand impact of the Utilities Variant would be less than the Project.

Wastewater

With the Utilities Variant, expansion of existing wastewater conveyance or treatment facilities operated by the SFPUC would not be necessary and no impact would occur. As the area would no longer contribute stormwater or wastewater to the Combined Sewer System operated by the SFPUC, the Utilities Variant would result in an exceedance of treatment capacity and would result in a less-than-significant impact. However, this impact would be less than anticipated with the Project.

Implementation of the Utilities Variant would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, and a less-than-significant impact would occur, similar to the Project.

Solid Waste

Construction of the Utilities Variant, including demolition of existing facilities, could generate solid waste that exceeds the permitted capacity of landfills serving the City of San Francisco. Trenching and excavation for the subterranean piping network and underground storage facilities (for the wastewater treatment facilities) could result in additional material that needs removal from the site. While it is assumed that at least some of this material can be utilized elsewhere within the development area, the potential for additional haul trips could result. However, any potential impact would be reduced to a less-than-significant level by implementation of mitigation measure MM UT-5a (Construction Waste Diversion Plan), similar to the Project.

Implementation of the Utilities Variant includes operation of a more sophisticated infrastructure system. The Utilities Variant would not substantially increase the number of residents or employees in the area, and would, therefore, not substantially increase solid waste generation. Operation of the decentralized waste treatment facilities would generate approximately 2,238 tons of sludge per year, which would be recycled, composted, or disposed of in landfills as permitted. The solid waste collection system that is proposed with the Utilities Variant would make it easier for residents and employees to recycle by creating a single point drop off for waste and recyclables. This waste stream would be sorted on site, prior to being hauled off site to a landfill or recycling station. Therefore, by making it easier for people to utilize methods of solid waste disposal other than waste that is taken to landfills, the Utilities Variant has the potential to reduce the generation of solid

waste arriving at San Francisco landfills. As operation of the Utilities Variant would not generate substantial solid waste, this Variant would not exceed the permitted capacity of landfills serving the City of San Francisco over what was analyzed for the Project, and impacts would be less than significant, similar to the Project.

Furthermore, operation of the Utilities Variant would be required to comply with federal, state, and local statutes and regulations related to solid waste, including the disposal of sludge. This impact would be less than significant with mitigation, similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into HPS Phase II. This could include a new substation within the Project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Utilities Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the Utilities Variant, similar to the Project.

Energy

Construction

Similar to the Project, construction would not be expected to result in demand for natural gas. However, construction of the Utilities Variant would require the use of electricity and fossil fuels. The construction activities proposed with the Utilities Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, construction activities would not be large in comparison to a project of a similar size and with similar land uses. Thus, the Utilities Variant would result in a less-than-significant impact, similar to the Project.

Operation

Operation of the Utilities Variant would include electricity and natural gas demand to run the heating and cooling plants, wastewater treatment plants and solid waste collection system and facilities. These uses would increase the use of electricity and natural gas in the area, however, this would not be considered a wasteful

use. Additionally, provision of these heating and cooling utilities in a centralized fashion would reduce the overall use of electricity and natural gas as compared to a decentralized system. The on-site wastewater treatment facilities would require an increased use of electricity and natural gas as compared to existing conditions at the site. However, by removing the wastewater generation of the Project from the wastewater stream treated by the SFPUC, electricity and natural gas utilized by the SFPUC would be reduced and effectively shifted to provide service with the Utilities Variant. As such, the overall demand on the grid would not be substantially increased. The proposed solid waste collection system would require additional electricity to run the collection facilities. However, the centralized collection areas have the potential to reduce the amount of waste being transferred to landfills based on the ease provided to residents and employees for recycling and alternative waste provisions. The reduction in waste and the centralized collection locations would reduce the amount of space allotted within each building to solid waste collection, which would effectively be transferred into these larger collection facilities, reduce the number of trucks to and from the area, and reduce the number of trips and idling that garbage trucks would generate around the proposed neighborhoods. Therefore, while operation of the Utilities Variant may increase the demand for electricity and natural gas, this use would not be considered wasteful and would not be large in comparison to operations of a similar size, and the Utilities Variant would result in a less-than-significant impact, similar to the Project.

Greenhouse Gas Emissions

The Utilities Variant would involve the development of additional on-site utility infrastructure. While construction of centralized utilities would result in a greater amount of development, most of the development would be underground, and the level of overall above-ground development with this alternative would be substantially similar to the Project. Construction and operational impacts would be substantially similar to the Project. The GHG emissions may even decrease due to the availability of less carbon intense electricity sources and alternatives for heating and cooling. However, depending on the amount of energy required to operate these new utilities, the GHG emissions may increase slightly. Since the majority of the GHG emissions for the Utilities Variant would remain the same, the GHG emissions would be less-than-significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Utilities Variant and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change. The Utilities Variant would not measurably change the parameters of the Project land use program, and thus this analysis applies to the Utilities Variant.

IV.F VARIANT 5: SAN FRANCISCO 49ERS AND OAKLAND RAIDERS SHARED STADIUM AT HUNTERS POINT SHIPYARD

IV.F.1 Overview

The San Francisco 49ers and Oakland Raiders Shared Stadium at Hunters Point Shipyard Variant (49ers/Raiders Shared Stadium Variant) assumes that development would occur exactly as proposed for the Project, except that the new stadium would be home to both the San Francisco 49ers and the Oakland Raiders. Therefore, there would be an increase in the number of football games that would occur during the NFL football season, which lasts from August until late December. This could result in an event at the stadium every week during the football season. For the purposes of this analysis, 20 football games and 20 other events per year were assumed. This assumption assumes a conservative, but possible scenario. It includes two pre-season and eight regular season games, and the possibility that either team could host up to two post-season playoff games. However, a maximum of four post-season games would only occur at the proposed stadium if (1) both teams were in separate conferences (American Football Conference or National Football Conference), (2) each team hosted and won either a first round wild-card playoff game or a second round divisional playoff game, and (3) each team then hosted a conference championship game. The likelihood of four post-season games occurring is remote; therefore, this EIR analysis only assumes up to two playoff games per year total, for a total of 20 games annually, the same as for the Project.

IV.F.2 Project Objectives

The objectives for the 49ers/Raiders Shared Stadium Variant would be the same as for the Project. A full list of Project objectives is provided in Section II.D of this EIR.

IV.F.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. Each of these components of the Project would also apply to this variant.

IV.F.4 Potential Environmental Effects

Overall, the 49ers/Raiders Shared Stadium Variant would not change the amount or type of development compared to the Project. However, the 49ers/Raiders Shared Stadium Variant includes an increase in NFL events per season from 12 to 20 games. Development with this Variant is also likely to result in events occurring weekly for the entire NFL season. Thus, no construction-related environmental effects would occur in excess of those identified for the Project. The potential operational effects of the 49ers/Raiders Shared Stadium Variant would be related to the increase of stadium use and would affect air quality, noise, transportation, utilities, energy, and aesthetics.

Land Use and Plans

Development of the 49ers/Raiders Shared Stadium Variant would be substantially similar to the Project and would not physically divide an established community or conflict with plans, policies, or regulations adopted to avoid or mitigate an environmental effect. Operation of the 49ers/Raiders Shared Stadium Variant would alter the existing land use character of the vicinity, but such an alteration would not be adverse, similar to the Project. The 49ers/Raiders Shared Stadium Variant would include eight additional football games a year. This additional use is consistent with uses and building characteristics proposed with the Project. Therefore, these additional event days would not result in an adverse change to the land use character of the site or the surrounding areas, and the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact, similar to the Project. The 49ers/Raiders Shared Stadium Variant would result in an urban development replacing deteriorating industrial and open space, similar to the Project, and would not conflict with existing land use plans. Thus, potential impacts of the 49ers/Raiders Shared Stadium Variant to land use and plans would be less than significant, similar to the Project.

Population, Housing, and Employment

In general, impacts from the 49ers/Raiders Shared Stadium Variant would be similar to the Project because land uses and densities are the same, with the exception of increased use of the football stadium. The 49ers/Raiders Shared Stadium Variant would allow 8 more football games at the football stadium. However, the 49ers/Raiders Shared Stadium Variant would not increase the number of residential units, nor other land uses. As such, the 49ers/Raiders Shared Stadium Variant would have the potential to increase the number of employment opportunities (operational) at the site over levels anticipated with the Project, as discussed below. However, the permanent residential population would not change.

Direct Impacts

With the 49ers/Raiders Shared Stadium Variant, construction is scheduled for completion beginning in the Year 2017, extending through the Year 2029, a period of approximately 12 years. This is similar to the construction schedule proposed at the HPS Phase II site for the Project, and, therefore, the number of construction personnel required at any given time at the HPS Phase II site would be similar to the total projected to be required for the Project. Construction employment opportunities are temporary in nature and would not result in a substantial increase in the number of employees in the area. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less than significant construction impact to population during construction.

Direct population growth with the 49ers/Raiders Shared Stadium Variant would include residents and employees who would occupy new homes and the employment space(s), respectively. With the 49ers/Raiders Shared Stadium Variant, 8 more football games would occur at the football stadium. There would be no change to the number of proposed housing units; therefore, the permanent resident population with the 49ers/Raiders Shared Stadium Variant would be the same as with the Project. However, the 49ers/Raiders Shared Stadium Variant would increase the number of jobs compared to the Project due to 8 more football games. As identified in Section III.C, the stadium is anticipated to generate approximately 359 jobs when used for football events (12 football games and 20 other events with the Project). With the 49ers/Raiders Shared Stadium Variant, 8 more football games would result in

approximately 10,820 jobs, approximately 90 more than the Project (refer to Table III.C-7 [Project Employment by Land Use]). Total employment with the 49ers/Raiders Shared Stadium Variant would represent approximately 1.4 percent of the 748,100 jobs anticipated Citywide in 2030. Overall, development with the 49ers/Raiders Shared Stadium Variant would be similar to the Project.

Although the 49ers/Raiders Shared Stadium Variant would result in an increase in employment at the HPS Phase II site, growth in this area has long been the subject of many planning activities. As with the Project, the 49ers/Raiders Shared Stadium Variant development program is based on the land uses, number of housing units, and objectives approved by voters under Proposition G in 2008. The uses proposed with the 49ers/Raiders Shared Stadium Variant would support planned growth for the Candlestick Point and HPS Phase II. As a result of these ongoing planning activities, City service providers have been aware of, and have included future growth projections for site in their long-term operations plans for population growth and necessary infrastructure.

Employment growth at HPS Phase II would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. The 49ers/Raiders Shared Stadium Variant would not alter the number of housing units proposed with the Project. There would be a net increase in jobs; however, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact, similar to the Project. Total demand for housing with the 49ers/Raiders Shared Stadium Variant would represent 3.9 percent of the total Bay Area housing need of 214,500 units (based on the RHNA targets; refer to Section III.C.3 projected by ABAG through 2014.[1291] Based on the total employment available with the 49ers/Raiders Shared Stadium Variant (10,820 jobs), total housing demand would be 8,330 units (approximately 90 more employees associated with 8 more football games would result in housing demand for 69 more units than the Project, refer to Table III.C-9 [Project Housing Demand]).[1292] As discussed above, the 49ers/Raiders Shared Stadium Variant would provide approximately 10,500 dwelling units. This would exceed the approximately 8,330 dwelling unit demand anticipated with the 49ers/Raiders Shared Stadium Variant. Therefore, the population increase associated with employment with the 49ers/Raiders Shared Stadium Variant could be entirely accommodated. However, it is likely that some employees with the 49ers/Raiders Shared Stadium Variant would elect to live elsewhere in the City or within surrounding Bay Area communities.

Based on existing commuting patterns, the 49ers/Raiders Shared Stadium Variant would generate a demand for about 3,749 units in surrounding Bay Area communities. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

It is not anticipated that the increase in employment with the 49ers/Raiders Shared Stadium Variant would create a substantial demand for housing in the immediate neighborhood, in San Francisco, or in the region in excess of the housing provided as part of the 49ers/Raiders Shared Stadium Variant or housing otherwise available in the Bay Area. Necessary improvements to infrastructure, public services, and housing associated with direct population growth proposed as part of the 49ers/Raiders Shared Stadium Variant

[1291] The RHNP is updated every five years and does not extend through 2030.
[1292] Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.

has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant, similar to the Project.

Indirect Impacts

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be potential for development with the 49ers/Raiders Shared Stadium Variant to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the 49ers/Raiders Shared Stadium Variant site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve both the Candlestick Point and HPS Phase II sites, without significant excess capacity that might encourage additional local growth beyond that already anticipated under Proposition G and with the redevelopment plans. Development with the 49ers/Raiders Shared Stadium Variant would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant, similar to the Project.

The potential for impacts due to housing displacement would be the same as the Project, and would be less than significant. The 49ers/Raiders Shared Stadium Variant would not increase residential units proposed with the Project however, any dwelling units removed with the 49ers/Raiders Shared Stadium Variant would be replaced on site by the proposed development.

■ Transportation and Circulation

The 49ers/Raiders Shared Stadium Variant assumes that both the 49ers and Oakland Raiders would play home games at the new stadium at HPS Phase II. This Variant addresses the requirements of the National Football League (NFL) for NFL teams in close geographic proximity to one another to evaluate the potential shared use of a stadium. Land uses would be identical to the Project, however, the number of days during which football games would occur at the stadium would increase from 12 under the Project to 20 under the 49ers/Raiders Shared Stadium Variant. Given that the teams typically play half of all pre-season, post-season, and regular season games at home, the use of the stadium by two NFL teams could result in one NFL event at the stadium occurring every week from the beginning of the pre-season in August through the end of December for up to 20 NFL events per year. In addition, there would also be up to 20 secondary smaller events at the stadium per year.

The 49ers/Raiders Shared Stadium Variant would not result in an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, and would be similar to that analyzed for the Project. The 49ers/Raiders Shared Stadium Variant would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management plan (CMP) for roads or highways. However, similar to the Project, traffic impacts related to the new stadium would be significant and unavoidable. The stadium would still likely host special events and would have the same impacts as the Project.

The 49ers/Raiders Shared Stadium Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or other airport land use plan, and therefore, would not result in a safety hazard from airport operations for people residing or working in the area. The 49ers/Raiders Shared Stadium Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less than significant impact to aircraft activity and traffic levels, similar to the Project.

Development under the 49ers/Raiders Shared Stadium Variant would not affect or increase hazards due to design features or incompatible uses aboveground. The new buildings would be designed consistent with the SFBC, which would reduce all potential design hazards to a less than significant level. The roadway network associated with the 49ers/Raiders Shared Stadium Variant would be designed to meet all applicable codes, including design guidelines for emergency access, and would result in a less than significant impact associated with design hazards. As a similar amount of development would result from the 49ers/Raiders Shared Stadium Variant as the Project, and since the same design standards would apply for both, potential traffic impacts from design hazards would be similar to the Project.

Thus substantial additional parking, above that provided by the Project, would not be required, and impacts would be less than significant. As the same amount of development and the same land uses would occur under the 49ers/Raiders Shared Stadium Variant as with the Project, parking impacts would be similar to the Project.

The 49ers/Raiders Shared Stadium Variant would comply with adopted policies and plans regarding alternative transportation, and impacts would be less than significant, similar to the Project.

Aesthetics

Construction

All construction-related impacts of the 49ers/Raiders Shared Stadium Variant would be similar to those identified for the Project since the development program is the same. All potential aesthetics impacts resulting from construction of the Project were found to be less than significant with the incorporation of mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts during Construction), which requires contractors to keep construction areas generally clean, regulates worker parking, requires strict control of the staging of equipment, and requires temporary fencing to block views of the staging areas from the street. MM AE-2 (construction staging) would be required with the 49ers/Raiders Shared Stadium Variant and impacts would, therefore, be less than significant with this Variant as well. Since construction of the 49ers/Raiders Shared Stadium Variant would, like the Project, be constructed during daylight hours, impacts resulting from additional sources of light and glare during construction would be less than significant.

Operation

Operation-related impacts of the 49ers/Raiders Shared Stadium Variant would be similar to those identified for the Project since the development program with each is the same. However, the 49ers/Raiders Shared Stadium Variant proposes to double the number of NFL events to 20 per year. The stadium would physically exist regardless of the number of events per year. Section III.E of this EIR found that effects resulting from the relocation of the stadium to HPS would not cause significant impacts related to substantial sources of new light and glare. Since it is estimated that the lighting towers at the stadium

would be 192 feet above street level, the lights can be focused directly onto the playing surface, which would minimize spillover lighting and generate virtually no additional light or glare in the surrounding area. In addition, the playing surface would not be visible outside of the stadium, thereby eliminating the possibility of glare from the playing surface impacting surrounding areas. The EIR found that light spill from the stadium would be between 0.2 and 1.0 foot-candle. Such a change in the light level at this location would be less than that associated with typical street lighting, which is not considered substantial. Project mitigation measures MM AE-7b.1 (field lighting testing) and MM AE-7b.2 (field lighting testing) would be incorporated into the 49ers/Raiders Shared Stadium Variant and would require any spillover of light from the stadium to be similar to that of surrounding street lighting. Since the impact of stadium light and glare is less than significant with the incorporation of mitigation measures with the Project, the doubling of the number of games with this Variant would not result in a significant impact.

All other impacts to visual character and scenic vistas related to the operation of the Project were found to be less than significant. The stadium use proposed with the Project would be the same with the 49ers/Raiders Shared Stadium Variant. Although the number of game days would be increased, the use would be the same and the amount of lighting needed for each use would be the same. Impacts resulting from the creation of additional light or glare that could impact scenic views of downtown or impacts surrounding land uses were found to be less than significant with the incorporation of mitigation measures MM AE-7a.1 (parking lot lighting), MM AE-7a.2 (landscape and sign illumination), MM AE-7a.3 (lighting plan), MM AE-7a.4 (non-reflective materials), MM AE-7b.1 (field lighting testing), and MM AE-7b.2 (field lighting testing). These measures require parking lot, security, and landscaping lighting to comply with City requirements that eliminate light spill onto surrounding uses and that proposed structures are constructed with non-reflective surface to eliminate glare. Therefore, since the 49ers/Raiders Shared Stadium Variant is the same as the Project with respect to the stadium use, impacts would be less than significant with mitigation.

Shadows

The 49ers/Raiders Shared Stadium Variant would result in the same development as the Project. The 49ers/Raiders Shared Stadium Variant would have the same impacts related to solar access as the Project. Overall, given the heights, layouts, and orientations of the Project buildings, existing parks and open space would experience variable levels of shading throughout the day, generally receiving some new shade from morning until noon in spring, summer, and fall with less increase in the afternoons in winter, spring, and fall. Public use of these existing parks in the vicinity of Candlestick Point would not be adversely affected by these shade conditions and impacts would be less than significant, similar to the Project.

The CPSRA would be affected by new shade in the afternoon but most areas would experience limited to no new shadow from the Project. Other areas of the CPSRA would largely continue to remain in the sun throughout the year. Project shadow would not interfere with the public's use or enjoyment of the CPSRA and impacts would be less than significant, similar to the project.

Wind

Since the proposed development with the 49ers/Raiders Shared Stadium Variant would be the same as the Project, impacts related to wind would be the same as the Project. The 49ers/Raiders Shared Stadium Variant would increase use of the stadium, which would have no effect on wind impacts. With the

incorporation of mitigation measure MM W-1a (Building Design Wind Analysis), impacts would be reduced to a less than significant level, similar to the project.

Air Quality

Since the proposed development with the 49ers/Raiders Shared Stadium Variant is exactly the same as the Project, impacts related to air quality would be substantially the same as the Project. The 49ers/Raiders Shared Stadium Variant only proposes more use of the stadium, which slightly increases the criteria pollutant emissions associated with extra use of the stadium and traffic coming to extra games.

Section III.G found that all impacts related to wind were less than significant with the incorporation of mitigation measure MM W-1a (wind modeling). This mitigation measure requires that a Building Design Wind Analysis be prepared prior to approval of 49ers/Raiders Shared Stadium Variant buildings, ensuring that the applicable 26 mph threshold would not be exceeded. If an impact would occur, the developer would be required to implement measures to reduce potential wind impacts. Thus, similar to the Project, impacts would be less than significant.

Construction

As stated above, overall construction impacts of the 49ers/Raiders Shared Stadium Variant with respect to air quality would be the same as the Project. The level of development with 49ers/Raiders Shared Stadium Variant and the level of construction activities that would occur over the approximately 20-year build-out period would be the same as the Project. Similar to the Project, construction activities with 49ers/Raiders Shared Stadium Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities. Any project within the City of San Francisco, including the 49ers/Raiders Shared Stadium Variant, would be required to comply with San Francisco Health Code Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, construction-related criteria pollutant impacts associated with the 49ers/Raiders Shared Stadium Variant would be less than significant and the same as the Project.

With respect to airborne human health risks, construction activities associated with the 49ers/Raiders Shared Stadium Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1293] that evaluated potential human health risks associated with construction and operation of the Project. As construction emissions associated with the 49ers/Raiders Shared Stadium Variant are expected to be the same as those associated with Project, the 49ers/Raiders Shared Stadium Variant would have the same impacts than the Project, would not exceed the BAAQMD CEQA threshold. As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the 49ers/Raiders Shared Stadium Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the 49ers/Raiders Shared Stadium Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the 49ers/Raiders Shared Stadium Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

Operational impacts to regional and local air quality would be substantially similar to the Project. The anticipated land uses would remain the same as the Project and impacts would be the same as identified with the Project. It should be noted that the shared use of the stadium by the San Francisco 49ers and the Oakland Raiders would increase the annual usage of the stadium but not the daily use. As such, the daily emissions anticipated with 49ers/Raiders Shared Stadium Variant would be the same as the Project.

Both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. 49ers/Raiders Shared Stadium Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated with the 49ers/Raiders Shared Stadium Variant would be expected to exceed existing BAAQMD thresholds. Under BAAQMD's

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[1293] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II.

current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce 49ers/Raiders Shared Stadium Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

With respect to airborne human health risks, emissions associated with operation activities under the 49ers/Raiders Shared Stadium Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$).

This 49ers/Raiders Shared Stadium Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1294]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. As the 49ers/Raiders Shared Stadium Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.7. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the 49ers/Raiders Shared Stadium Variant.

- In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways for the 49ers/Raiders Shared Stadium Variant (Variant 5) would remain unchanged from the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations from traffic associated with the 49ers/Raiders Shared Stadium Variant (Variant 5) were estimated compared against the 0.2 $\mu g/m^3$ action level to determine the potential health risks on receptors attributed to vehicle emissions from the 49ers/Raiders Shared Stadium Variant (Variant 5).

[1294] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

- With the addition of Variant-related traffic, no receptors along the streets listed above would experience an increase in $PM_{2.5}$ concentrations in excess of the 0.2 $\mu g/m^3$ action level.[1295] Concentrations would not exceed the action level, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As described above, the 49ers/Raiders Shared Stadium Variant land uses will be the same as the Project. However, with the shared stadium, there would be an increase in the number of football games that would occur during the football season. This could result in an event at the stadium every week during the football season. As the footprint of development, the total amount of development, and the land uses provided with the 49ers/Raiders Shared Stadium Variant would be the same as the Project, noise impacts of a 49ers/Raiders Shared Stadium Variant would also be the same as the Project, except with additional noise impacts around the stadium associated with the additional game days.

Construction activities for a 49ers/Raiders Shared Stadium Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the 49ers/Raiders Shared Stadium Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high

[1295] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, May 4, 2010.

as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a 49ers/Raiders Shared Stadium Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a 49ers/Raiders Shared Stadium Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a 49ers/Raiders Shared Stadium Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Football games and concerts at the proposed stadium with a 49ers/Raiders Shared Stadium Variant would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measure MM NO-7.1 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 45 dBA; however, as with the Project, the feasibility and practicality of mitigation measure MM NO-7.1 cannot be determined at this time, this impact would remain significant and unavoidable.

The 49ers/Raiders Shared Stadium Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the 49ers/Raiders Shared Stadium Variant does not include an aviation component. Therefore, a 49ers/Raiders Shared Stadium Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

Although no fossils have been reported at the HPS Phase II site, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. Additionally, the presence of Bay mud under the fill around Hunters Point also indicates the possibility of fossils being discovered during construction-related excavation. However, mitigation measure MM CP-3a (paleontological resources) and MM CP-2a (human remains) would reduce the effects of construction-related activities to paleontological resources to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*. Impacts related to the disturbance of human remains was also found to be less than significant with the incorporation of mitigation measure MM CP-2a (human remains), which requires compliance with all applicable laws related to the discovery of human remains. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to paleontological resources during construction activities, similar to the Project.

Previous archaeological investigations have shown that prehistoric archaeological sites within the Candlestick Point and HPS Phase II sites tend to be located along the original shoreline. Hunters Point had numerous maritime-related industries, including dry docks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site and construction activities may encounter previously unknown archaeological resources. Candlestick Point was found to have potential archaeological resources resulting from Chinese fishing camps. Similar to the Project, implementation of mitigation measure MM CP-2a (archeological resources) for this Variant would reduce the effects of construction-related activities to potential archaeological resources within the HPS Phase II and Candlestick Point sites to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to archaeological resources during construction activities, similar to the Project.

- Similar to the Project, development with the 4934s/Raiders Shared Stadium Variant would result in the demolition of Buildings 211, 224, 231, and 253, which have been determined eligible for the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. As such, this would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district; the impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Furthermore, with incorporation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historic resources), (which requires the preparation of a written and photographic documentation of the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, as identified in the report titled *Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Draft Historic Resources Survey and Technical Report*, July 2009, prepared by Circa Historic Property Development), potential impacts would be reduced to the extent possible. Nonetheless, the impact to historical resources during construction activities of the 49ers/Raiders Shared Stadium Variant would remain significant and unavoidable, similar to the Project.

Operational activities with the 49ers/Raiders Shared Stadium Variant would include the day-to-day activities typical of residential, office, commercial, and stadium use. However, this would not have the potential to adversely disturb paleontological, archaeological, or historical resources. Therefore, the 49ers/Raiders Shared Stadium Variant would result in no impact to these resources, similar to the Project.

Hazards and Hazardous Materials

The footprint of development for a 49ers/Raiders Shared Stadium Variant would be the same as for the Project. As such, impacts from construction of this Variant would be the same as the Project.

Construction activities associated with the 49ers/Raiders Shared Stadium Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils

or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the 49ers/Raiders Shared Stadium Variant would be similar to the Project, and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the 49ers/Raiders Shared Stadium Variant would require improvements to existing utility infrastructure and installation of new underground utilities, but this would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The 49ers/Raiders Shared Stadium Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the 49ers/Raiders Shared Stadium Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the 49ers/Raiders Shared Stadium Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses.

The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the 49ers/Raiders Shared Stadium Variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the 49ers/Raiders Shared Stadium Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the 49ers/Raiders Shared Stadium Variant. Consistent with the discussion above, the 49ers/Raiders Shared Stadium Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the 49ers/Raiders Shared Stadium Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. Implementation of mitigation measures MM HZ-1a and HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II, mitigation measure MM HZ-9 also requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

The 49ers/Raiders Shared Stadium Variant would provide for 8 more game days than the Project. This would result in the same amount of hazardous materials being used compared to the Project. The 49ers/Raiders Shared Stadium Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial

risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. Maintenance products anticipated under the 49ers/Raiders Shared Stadium Variant would be incrementally small, and would not substantially increase the risk from handling these materials. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The 49ers/Raiders Shared Stadium Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials. Impacts would be less than significant, similar to the Project.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. Compliance with federal, state, and local regulations would ensure that the impact would be less than significant, the same as for the Project.

Daily operations under the 49ers/Raiders Shared Stadium Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment but it would not pose a human health risk and/or result in an adverse effect on the environment. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The 49ers/Raiders Shared Stadium Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the 49ers/Raiders Shared Stadium Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The 49ers/Raiders Shared Stadium Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

Since the 49ers/Raiders Shared Stadium Variant would be developed exactly as the Project, impact significance determinations made for the Project in Section III.L (Geology and Soils) of this EIR would be the same with this Variant.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with the 49ers/Raiders

Shared Stadium Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the 49ers/Raiders Shared Stadium Variant would be substantially similar to those of the Project.

The potential for exposure to adverse effects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures and the Yosemite Slough bridge, as required by the SFBC and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse effects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of 49ers/Raiders Shared Stadium Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for 49ers/Raiders Shared Stadium Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the 49ers/Raiders Shared Stadium Variant, the potential for adverse effects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance

documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the 49ers/Raiders Shared Stadium Variant, more game days would occur, and no structural development difference would occur. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse effects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual 49ers/Raiders Shared Stadium Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the 49ers/Raiders Shared Stadium Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse effects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level, similar to the Project.

With the 49ers/Raiders Shared Stadium Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the 49ers/Raiders Shared Stadium Variant.[1296] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the 49ers/Raiders Shared Stadium Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The R&D Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

[1296] GTC, 2005.

Hydrology and Water Quality

The footprint and amount of development for the 49ers/Raiders Shared Stadium Variant would be the same as for the Project. As such, impacts from construction of the 49ers/Raiders Shared Stadium Variant would be similar to the Project.

Construction

Construction activities associated with a 49ers/Raiders Shared Stadium Variant would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

Construction activities associated with the 49ers/Raiders Shared Stadium Variant would include excavation for building foundations and underground utilities which could require short-term and/or long-term dewatering of the affected areas. As the total amount of open space under the 49ers/Raiders Shared Stadium Variant would remain the same as under the Project, the amount of permeable surface would also remain the same. Therefore, the 49ers/Raiders Shared Stadium Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the 49ers/Raiders Shared Stadium Variant site and thus no streams or rivers would be altered by construction activities. During construction of the 49ers/Raiders Shared Stadium Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the 49ers/Raiders Shared Stadium Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on site or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated the 49ers/Raiders Shared Stadium Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the 49ers/Raiders Shared Stadium Variant Operation of the Housing Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the

Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the 49ers/Raiders Shared Stadium Variant would the same as with the Project, impacts would be the same as those with the Project.

Implementation of the 49ers/Raiders Shared Stadium Variant would not utilize groundwater as a source of water supply, substantially deplete groundwater supplies, or substantially interfere with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and this impact would be less than significant, similar to the Project.

Operation of a 49ers/Raiders Shared Stadium Variant could alter the existing drainage pattern of the site, but would not alter the course of an existing stream or river or result in substantial erosion, siltation, or flooding on-site or off-site, similar to the project. Implementation of the 49ers/Raiders Shared Stadium Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of a 49ers/Raiders Shared Stadium Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce impact to a less-than-significant level, similar to the Project.

Implementation of a 49ers/Raiders Shared Stadium Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the 49ers/Raiders Shared Stadium Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

The footprint of development for 49ers/Raiders Shared Stadium Variant would be the same as for the Project, and the area subject to ground disturbance would be the same as the Project. Both construction and operational impacts to biological resources would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those under the Project, with the exception of the new stadium being home to both the San Francisco 49ers and the Oakland Raiders.

Construction

Development of the 49ers/Raiders Shared Stadium Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats since ecological enhancements and measures to avoid and minimize impacts to common vegetation communities and wildlife species would be proposed, similar to the Project. Impacts would be less than significant, similar to the Project.

Development of the 49ers/Raiders Shared Stadium Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur.

Similar to the Project, the Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the 49ers/Raiders Shared Stadium Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the 49ers/Raiders Shared Stadium Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the 49ers/Raiders Shared Stadium Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the 49ers/Raiders Shared Stadium Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the 49ers/Raiders Shared Stadium Variant would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Utilities Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to the 49ers/Raiders Shared Stadium Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the 49ers/Raiders Shared Stadium Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of the 49ers/Raiders Shared Stadium Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Project would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the 49ers/Raiders Shared Stadium Variant would be similar to construction of the Project, no impact to school or library services during construction of the Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Development with the 49ers/Raiders Shared Stadium Variant would have similar impacts to police protection services as development with the Project. Although the 49ers/Raiders Shared Stadium Variant would double the number of NFL events per year (from 12 to 20), response times and service staffing ratios are calculated on a daily basis, and, therefore, twice the number of days with an acceptable levels of service still results in less-than-significant impacts. Response times are determined per event where police response is required and, therefore, is not degraded by the number of days where potential response would be required. Therefore, since operational impacts to police protection services were found to be less than significant for the Project, impacts to police protection services for the 49ers/Raiders Shared Stadium Variant would also be less than significant.

Fire Protection Services

Development with the 49ers/Raiders Shared Stadium Variant would have similar impacts to fire services as development with the Project. Although the 49ers/Raiders Shared Stadium Variant would double the number of NFL events per year (from 12 to 20), response times and service staffing ratios are calculated on a daily basis, and, therefore, twice the number of days with acceptable levels of service still results in less-than-significant impacts. Response times are determined per event where fire/emergency medical service response is required and, therefore, is not degraded by the number of days where potential response would be required. Therefore, since operational impacts to these services were found to be less than significant for the Project, impacts to these services for the 49ers/Raiders Shared Stadium Variant would also be less than significant.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help minimize demand for future fire protection services. Plan review of all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services.

Response Time

Construction of a new SFFD facility on land designated for community serving uses on the Project site, along with the provision of additional firefighters and on-going fire protection operations, would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the 49ers/Raiders Shared Stadium Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1297] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, similar to the Project, the development of this Variant would not require new or physically

[1297] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is less than significant.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school aged children that would require adequate school services would be the same as with the Project. Impacts from the 49ers/Raiders Shared Stadium Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Therefore, the service population for the existing library facilities would be the same as with the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less than significant operational impact to library services, similar to the Project.

Recreation

Development with the 49ers/Raiders Shared Stadium Variant would be similar to the Project. The Shared Stadium Variant would include the construction and improvement of new parks, recreational facilities, and open space. At buildout of this Variant, approximately 337.5 acres of parks, open space, and recreational uses would be provided, as described in Table IV-1, which is about 0.5 acre more than proposed with the Project. The Sports Field Complex with the Shared Stadium Variant would be the same as the Project, which is 91.6 acres; however, a total of 148.6 acres of parkland would be provided, about 0.5 acre more than proposed with the Project.

Construction impacts related to recreational facilities would be the substantially the same as those identified with the Project because the construction activities would be substantially similar, with the Shared Stadium Variant requiring slightly more construction due to the provision of about 0.5 acres more of parkland.

The Shared Stadium Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465, although 0.5 acres more of parkland would be provided. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Shared Stadium Variant would be 13.7, which is the same as the Project. The Shared Stadium Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

The timing of Shared Stadium Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities. The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Shared Stadium Variant). As this table indicates, the park-to-population ratio would not drop below 13.8 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Adequate parkland would be provided during each stage of development.

However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Shared Stadium Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). Because this Variant is the same as the Project in terms of development amounts and locations, it would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Shared Stadium Variant would be substantially similar to the Project.

Utilities

Implementation of the Shared Stadium Variant would increase demand for water treatment, which could be accommodated within existing water treatment facilities operated by the SFPUC, and impacts would be less than significant. As the same amount of development would occur with the Shard Stadium Variant as with the Project, the demand for water treatment would be the same, and impacts would be similar to the Project.

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the Shared Stadium Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies

could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1298] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1299,1300] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Shared Stadium Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

Wastewater

Construction impacts of the 49ers/Raiders Shared Stadium Variant would be similar to the Project due to their similar development programs. Existing wastewater infrastructure within the Project site is aging and in poor condition in some locations as a result of the intrusion of saline groundwater from the San Francisco Bay, which corrodes pipes, and the settling of fill material that underlies portions of the area, which has resulted in pipeline stress at some locations.[1301] Similar to the Project, the 49ers/Raiders Shared Stadium Variant would replace existing wastewater conveyance infrastructure within the HPS Phase II and Candlestick Point areas to adequately serve development with this Variant.

[1298] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.
[1299] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.
[1300] SFPUC, Urban Water Management Plan, 2005.
[1301] Winzler & Kelly Consulting Engineers, *Candlestick Point/Hunters Point Shipyard Infrastructure Concept Report*, October 26, 2009.

As shown in Table IV-36 (49ers/Raiders Shared Stadium Variant Wastewater Generation), the 49ers/Raiders Shared Stadium Variant would result in the generation of approximately 2.03 mgd of wastewater, an increase of 0.85 mgd of wastewater over the Project (refer to Table IV-37 [Sewer Trunk Capacity and Shared Stadium Variant Maximum Peak Flows] for peak flows). The 49ers/Raiders Shared Stadium Variant would have an increase in wastewater generation when compared to the Project since the stadium would theoretically be used 40 days instead of 32 days during each NFL season.

Table IV-36 49ers/Raiders Shared Stadium Variant Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed As % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total Shared Stadium Variant (mgd)*
Residential	95%	1.08	0.36	1.44
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.41	0.41
Hotel	57%	0.03	0	0.03
Artist Studios	95%	0	0.02	0.02
Football Stadium	95%	0	0.02	0.02
Performance Venue	95%	0.01	0	0.01
Total		***1.21***	***0.84***	***2.05***

SOURCE: Arup, October, 2009 and PBS&J, October, 2009

Table IV-37 Sewer Trunk Capacity and Shared Stadium Variant Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Variant Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With Shared Stadium Variant*
Candlestick tunnel sewer	34,722	1,736	5,208	2,520.8	26,993.2[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	1,750	69,082[f]

SOURCE: Bayside Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that will be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project will be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that will be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project will be somewhat greater than 69,853 gpm.

Similar to the Project, since the existing conveyance infrastructure could accommodate additional flows from the development in addition to existing flows, even during periods of peak flows, no expansion of the off-site wastewater conveyance lines would be required as a result of the 49ers/Raiders Shared Stadium Variant development.

Stormwater flows from the Candlestick Point site would be the same with the 49ers/Raiders Shared Stadium Variant as the Project, and would not increase. Therefore, treatment of stormwater from Candlestick Point would also be the same as the Project. Stormwater from the Project site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With development of the49ers/Raiders Shared Stadium Variant, stormwater would continue to be collected and treated in a separate stormwater system, and stormwater runoff would not contribute to the Combined Sewer System during wet weather. Although development with the49ers/Raiders Shared Stadium Variant site would result in a slight net increase in wastewater flows of 0.85 mgd, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP. The increase in wastewater generation with the 49ers/Raiders Shared Stadium Variant would incrementally contribute to the total amount of wet-weather flows that are collected and treated at the SWPCP, the NPWWF, and the Bayside Wet Weather Facilities. When the combined storage and treatment capacity of those facilities are exceeded, wastewater could be discharged, along with other wet-weather flows from the combined system, via the CSOs located around the perimeter of San Francisco. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact would be less than significant, similar to the Project.

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the 49ers/Raiders Shared Stadium Variant would be treated at the SWPCP wastewater treatment plant and the SFPUC, which operates the SWPCP wastewater treatment plant, and is required to comply with waste discharge requirements (WDRs) set by the RWQCB, which specify the allowable levels of pollutants in discharges from the facility. Compliance with any applicable WDRs, as monitored and enforced by the SFPUC, would ensure that the 49ers/Raiders Shared Stadium Variant would not exceed the applicable wastewater treatment requirements of the RWQCB, and this impact would be less than significant, similar to the Project.

Solid Waste

With the 49ers/Raiders Shared Stadium Variant, construction wastes, including demolition and hazardous wastes, would be similar to that generated with the Project. Construction waste would be sorted, prior to disposal, to ensure that all recyclable materials are salvaged from the waste stream that is ultimately taken to a landfill. Incorporation of mitigation measures MM UT-5a (Construction Waste Diversion Plan) would ensure that solid waste impacts during construction are reduced to a less-than-significant level.

As shown in Table IV-38 (49ers/Raiders Shared Stadium Variant Projected Solid Waste Generation), the 49ers/Raiders Shared Stadium Variant would result in approximately 22,411.9 tons of waste per year at full build-out, similar to the Project. The increase in solid waste generation associated with the 49ers/Raiders Shared Stadium Variant development would not be substantial in the context of citywide solid waste infrastructure demand. Development with the 49ers/Raiders Shared Stadium Variant would increase yearly production of solid waste by 585 tons per year as a result of twice as many NFL events annually.

Table IV-38 49ers/Raiders Shared Stadium Variant Projected Solid Waste Generation

Land Use	*Generation Factor*	*Total Tons*
Residential	5.653/Unit	29.67
Retail	0.02600411 lbs/sf	11.50
Office	0.006 lbs/sf	0.45
Hotel	0.0108 lbs/sf	0.81
R&D	0.006 lbs/sf	75.0
Performance Venue	2.23 lbs/seat	76.94
Community Services	0.006 lbs/sf	0.3
Total		***194.67***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste. The City has a contract with Altamont Landfill to accept the City's waste through 2014. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1302]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs.

As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1303] Demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of

[1302] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.
[1303] CIWMB, 2009.

at least 75 percent of construction waste, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Shared Stadium Variant on solid waste would be further reduced. The impact of the construction waste generated by the Shared Stadium Variant on the capacity of the Altamont Landfill would be less than significant.

Typical municipal solid waste has a landfill density of 739 pounds per cubic yard.[1304] Using this density factor, 45.7 million cubic yards of remaining capacity at the Altamont Landfill would be equivalent to 33.7 million tons of remaining capacity. The contribution of 72,592 tons from the 49ers/Raiders Shared Stadium Variant development would represent only 0.02 percent of the remaining capacity of the Altamont Landfill. Additionally, approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1305] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1306] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes. The City has prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals. These strategies would be utilized to achieve the City's overall waste reductions goals. The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

Similar to the Project, all residents and businesses of the 49ers/Raiders Shared Stadium Variant development would be expected to comply with the City's waste and recycling ordinances. As there would be several landfills with sufficient capacity to accommodate the solid waste generated by the 49ers/Raiders Shared Stadium Variant, along with the City's past waste diversion rate of 72 percent in 2008, implementation of the comprehensive waste diversion strategies, and implementation of mitigation measure MM UT-7a (Solid Waste Management Plan), the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to solid waste generation, although impacts would be slightly greater than those of the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12 KV distribution and or 115 KV transmission lines into HPS Phase II. This could include a new substation within the Project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the 49ers/Raiders Shared Stadium Variant,

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[1304] http://wasteage.com/mag/waste_municipal_solid_waste/. Accessed September 29, 2009.
[1305] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Available at <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008.
[1306] San Francisco, *Waste Characterization Study: Final Report.* 2008.

similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the 49ers/Raiders Shared Stadium Variant, similar to the Project.

Energy

Construction

Similar to the Project, construction of the 49ers/Raiders Shared Stadium Variant is not expected to result in a substantial increase in the demand for natural gas. The BAAQMD and the CARB offer incentives for the replacement of diesel construction equipment with lower-emitting engines, which may include natural gas. However, such engines are not standard and would not be required for Project or Variant construction.

Similar to the Project, the construction activities proposed with the 49ers/Raiders Shared Stadium Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, given the type of development proposed, the energy demand created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. During the construction period, the Project Applicant would be required to use the BAAQMD's Construction Best Management Practices. The Best Management Practices limit equipment idling time to 5 minutes (also required by CCR Title 13, Section 2485), which helps to minimize wasteful fuel consumption. Additional standards pertaining to construction fuel efficiency have not been developed by the City, the CEC, or any other regulatory agency. Given these considerations, the construction-related energy use associated with the 49ers/Raiders Shared Stadium Variant would not be large or wasteful and is considered less than significant, similar to the Project.

Operation

Electricity

The criterion for this impact considers whether the 49ers/Raiders Shared Stadium Variant would result in a large increase in electricity consumption. The 49ers/Raiders Shared Stadium Variant would use nearly double the amount of electricity for stadium use, when compared to the Project, due to an increase from 12 games to 20 games per year. This would increase the 49ers/Raiders Shared Stadium Variant consumption to 8,160 from 4,080 MWh/year. This would result in an overall increase in total 49ers/Raiders Shared Stadium Variant consumption to 39,054 MWh/year from 34,974 MWh/year resulting from the Project. This represents an 11 percent annual increase. Taking the 49ers/Raiders Shared Stadium Variant's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as

well as the level of development proposed, the electricity increase associated with the 49ers/Raiders Shared Stadium Variant would not be considered large.

The City's threshold also considers whether the 49ers/Raiders Shared Stadium Variant's energy consumption would be wasteful. The efficiency measures proposed under the 49ers/Raiders Shared Stadium Variant would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the 49ers/Raiders Shared Stadium Variant's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the 49ers/Raiders Shared Stadium Variant's voluntary implementation of LEED® ND standards. However, because the 49ers/Raiders Shared Stadium Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the 49ers/Raiders Shared Stadium Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less than significant.

Natural Gas

The 49ers/Raiders Shared Stadium Variant would use nearly double the amount of natural gas for stadium use, when compared to the Project, due to an increase from 12 games to 20 games per year. This would increase the 49ers/Raiders Shared Stadium Variant consumption to 14,400 from 7,200 MBtu per year. This would result in an overall increase in total 49ers/Raiders Shared Stadium Variant consumption to 70,463 MBtu per year from 63,263 MBtu per year resulting from the Project. The 49ers/Raiders Shared Stadium Variant would result in an 11 percent increase over the natural gas amount that would be consumed by the Project. This is due to the increase from 12 yearly NFL events to 20 yearly NFL events with this Variant. The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be over four times higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly five times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the R&D Variant would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

However, because the R&D Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the R&D Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

Petroleum Consumption

The 49ers/Raiders Shared Stadium Variant would increase trips to and from the Project site, increasing the use of petroleum fuels. Based on average fuel efficiencies for the City of San Francisco and the Project VMT (reported in the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*), the 49ers/Raiders Shared Stadium Variant would result in a demand for 14.01 million gallons of gasoline and 0.93 million gallons of diesel annually. The use of fuels resulting from Similar to the Project, Project-related travel to and from the Project site with development of this Variant would be five times as high as existing conditions, a large increase in consumption. Similar to the Project, the 49ers/Raiders Shared Stadium Variant would increase trips to and from the site, increasing the use of petroleum fuels. However, this consumption would not be wasteful because (1) the 49ers/Raiders Shared Stadium Variant proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) the 49ers/Raiders Shared Stadium Variant would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips; and (3) the 49ers/Raiders Shared Stadium Variant would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as the overall trip lengths. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact due to the wasteful use of transportation-related fuels, similar to the Project.

Greenhouse Gas Emissions

The 49ers/Raiders Shared Stadium Variant would have similar GHG emissions as the Project for both construction and operational emissions with the implementation of the mitigation measures. GHG emissions for this Variant were not explicitly calculated since the only increase would be in a few more game days (20 instead of 12) and associated mobile emissions which would make a small increase to the total annual GHG emission inventory. Therefore, since the majority of the GHG emissions for the 49ers/Raiders Shared Stadium Variant would remain the same, based on the less-than-significant conclusion for the Project, the 49ers/Raiders Shared Stadium Variant would also be less than significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the 49ers/Raiders Shared Stadium Variant and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change. The 49ers/Raiders Shared Stadium Variant would not measurably change the parameters of the Project land use program, and thus this analysis applies to the 49ers/Raiders Shared Stadium Variant.

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CHAPTER V Other CEQA Considerations

V.A INTRODUCTION

Section 15126 of the *California Environmental Quality Act* (CEQA) Guidelines requires that all aspects of a project must be considered when evaluating its impact on the environment, including planning, acquisition, development, and operation. As part of this analysis, the Environmental Impact Report (EIR) must also identify (1) significant environmental effects of the proposed project; (2) significant environmental effects that cannot be avoided if the proposed project is implemented; (3) significant irreversible environmental changes that would result from implementation of the proposed project; (4) effects found not to be significant; (5) growth-inducing impacts of the proposed project; and (6) secondary land use effects, including urban decay.

This Section is based upon information from documents[1307] including, but not limited to, the California Department of Recreation *Candlestick Point State Recreation Area General Plan*, Association of Bay Area Governments (ABAG) *San Francisco Bay Trail Plan*, San Francisco Bay Conservation and Development Commission *San Francisco Bay Plan*, San Francisco Bay Conservation and Development Commission *Bay Area Seaport Plan*, San Francisco Bay Conservation and Development Commission *Bay Area Water Trail Plan*, *City of San Francisco General Plan*, City of San Francisco *Bayview Hunters Point Redevelopment Plan*, City of San Francisco *Hunters Point Shipyard Redevelopment Plan*, the *City of San Francisco Planning Code*, and from physical observations of the Project site and vicinity from site visits conducted by PBS&J in 2008. Data for this Section were also taken from the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan: Secondary Land Effects* by CBRE Consulting dated September 2009 and contained in Appendix U (CBRE Secondary Land Use Effects Study).

V.B SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROJECT

- Table ES-2 (Summary of Environmental Effects and Project Requirements/Mitigation Measures), which is contained in the Executive Summary chapter of this EIR, and Section III.A through Section III.S of this EIR provide a comprehensive identification of the Project's environmental effects, including the level of significance both before and after mitigation.

V.C SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED IF THE PROJECT IS IMPLEMENTED

CEQA Guidelines Section 15126.2(b) requires that an EIR describe any significant impacts that cannot be avoided, even with the implementation of feasible mitigation measures. Development of the Project would result in the following significant and unavoidable project-related and/or cumulative impacts:

[1307] Copies of these documents are on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

Transportation and Circulation

- Construction-related traffic impacts in the Project vicinity due to construction vehicle traffic and roadway construction especially over the long duration of expected construction activity
- Operation of the Project would result in an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system
- Operation of the Project would result in impacts at nine intersections where no feasible traffic mitigation measures have been identified
- Operation of the Project would result in AM peak hour traffic impacts at the intersection of Tunnel/Blanken and contribute to cumulative PM peak hour traffic impacts
- Operation of the Project would result in Project contributions at 12 study intersections that would operate at LOS E or LOS F under 2030 No Project conditions (cumulative impacts)
- Operation of the Project would result in Project contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions (cumulative impacts)
- Operation of the Project would result in Project contribution to cumulative traffic impacts at four freeway segments
- Operation of the Project would result in impacts at four freeway on-ramp locations
- Operation of the Project would result in Project contribution to significant cumulative traffic impacts at 12 freeway ramp locations
- Operation of the Project would result in impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp
- Operation of the Project would result in Project contribution to significant cumulative traffic impacts related to freeway diverge queue storage at five off-ramp locations
- Operation of the Project would result in increased congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno
- Operation of the Project would result in increased congestion and contribute to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero and the 44-O'Shaughnessy
- Operation of the Project would result in increased congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset
- Operation of the Project would result in increased congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street
- Operation of the Project would result in increased congestion at intersections in the study area, and make a considerable contribution to cumulative impacts which would increase travel times and impact operations of the 54-Felton
- Operation of the Project would result in increased congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts which would increase travel times and impact operations of the T-Third
- Operation of the Project would result in increased congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited

- Operation of the Project would result in increased congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express
- Operation of the Project would result in increased congestion on US-101 mainline and ramps, and on Bayshore Boulevard, which would increase travel times and impact operations of SamTrans bus lines on these facilities
- Proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street
- For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections
- Existing game day service and Project transit improvements would not be adequate to accommodate projected transit demand
- Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp
- Existing transit service and Project improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators
- Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Project conditions without an arena event
- Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations

Air Quality

- Operation of the Project would result in violations of BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out in the year 2029

Noise

- Construction would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete
- Construction activities would result in a substantial temporary or periodic increase in ambient noise levels
- Increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes
- Noise during football games and concerts at the proposed stadium could result in temporary increases in ambient noise levels that would adversely affect surrounding residents for the duration of a game or concert

Cultural Resources

- Development of the Project could result in a substantial adverse change in the significance of a historical resource

V.D SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL EFFECTS

Section 15126.2(c) of the CEQA Guidelines requires a discussion of any significant irreversible environmental changes that would be caused by the Project. Specifically, Section 15126.2(c) states:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as a highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to ensure that such current consumption is justified.

Generally, a project would result in significant irreversible environmental changes if any of the following would occur:

- The primary and secondary impacts would generally commit future generations to similar uses
- The Project would involve a large commitment of nonrenewable resources and the proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy)
- The Project results in irreversible damage from environmental accidents

Commitment to Similar Uses

Over the past three decades, various planning and development activities and associated environmental reviews have been undertaken for the Bayview Hunters Point neighborhood, including, most notably, Candlestick Point and HPS. All of these planning efforts have led to the Project's specific development program, which indicates a continued and long-term commitment of the Project site for the revitalization activities envisioned as part of the Project. The following discussion briefly outlines the planning history that has led to the Project, as proposed.

The existing General Plan land use map designates properties within the Project site as Candlestick Point Special Use District, Residential, Mixed Use, Parks and Open Space, and Public Facilities. These land use categories reflect Proposition F (1997), which amended the General Plan, *Planning Code*, and Zoning Map, and established the Candlestick Point Special Use District to accommodate the development of a stadium suitable for professional football and a shopping and entertainment center with open space and related parking facilities as principal uses, as well as other conditional uses, such as residential uses, subject to the approval of the Planning Commission.

Also in 1997, the Board of Supervisors, by Ordinance No. 285-97, adopted the HPS Redevelopment Plan for the revitalization of HPS.[1308] The HPS Redevelopment Plan contemplates development of a range of

[1308] San Francisco Redevelopment Agency, *Redevelopment Plan for the Hunters Point Shipyard Redevelopment Project*, July 14, 1997. A copy of this document is available for public review at the San Francisco Redevelopment Agency, One South

uses under the broad categories of industrial, research and development, mixed use, cultural and educational, residential, and open space. The HPS Redevelopment Plan divides the shipyard into five development parcels, Parcels A through E. Parcel F, which comprises approximately 440 acres of submerged land in the Bay was not proposed for development in the HPS Redevelopment Plan.[1309,1310]

The San Francisco Board of Supervisors adopted the *Bayview Hunters Point Redevelopment Plan* (BVHP Redevelopment Plan) in 2006. The BVHP Redevelopment Plan amends the *Hunters Point Redevelopment Plan*, established in 1969 and last amended in 1994. The primary redevelopment programs of the BVHP Redevelopment Plan include an Economic Development Program, Affordable Housing Program, and a Community Enhancements Program.

In late 2006, the San Francisco 49ers decided that the proposed stadium did not meet their needs. A site for a new stadium at HPS was identified. In May 2007, the Board of Supervisors and the Mayor endorsed a Conceptual Framework for the planning and development of the Project site, which includes Candlestick Point and HPS Phase II.

In June 2008, and in response to the Conceptual Framework, the San Francisco voters approved Proposition G, which is called the Bayview Jobs, Parks, and Housing Initiative. Proposition G encourages development of Candlestick Point and HPS with a mixed-use project, including park and open space improvements, approximately 10,000 homes for sale or rent, about 700,000 gsf of retail uses, about 2,150,000 gsf of "green" office, science and technology, research and development, and industrial uses, an arena, and a site for a new San Francisco 49ers stadium.

Implementation of the Project would require amendments to the BVHP Redevelopment Plan and the HPS Redevelopment Plan and Design for Development,[1311] as well as revisions to the General Plan, *Planning Code*, and zoning map to establish, in part, land use designations and allowable land uses, zoning, and design standards for future development.

The Project would include residential, office, retail, entertainment, and office uses, as well as community facilities, open space, and a new stadium and arena, to be developed adjacent to existing neighborhoods and within the existing Alice Griffith neighborhood, where new residential units would replace existing dwellings. Development of the Project would result in a continued commitment of the City of San Francisco to these uses, thereby precluding any other uses for the lifespan of the Project.

Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

[1309] In 1992, HPS was divided into six separate parcels, known as Parcels A, B, C, D, E, and F. These parcels correspond to the Navy's plan to phase remediation of hazardous materials on HPS on a parcel-by-parcel basis.

[1310] In accordance with procedures for transfer of Navy property, the Agency accepted title to Parcel A in December 2004. In April 2005, the Agency transferred the portions of Parcel A-Prime to be privately developed to Lennar Urban to construct the infrastructure improvements required under the Phase I DDA. Subsequently, the transfer of Parcel B-Prime from the Navy to the Agency was delayed. As a result, on October 17, 2006, the Agency Commission approved an amendment to the Phase I DDA to remove Parcel B-Prime from the Phase 1 development and to shift the entitled residential units from Parcel B-Prime to Parcel A-Prime. The revised Design for Development standards for Parcel A address dwelling unit density standards, height and bulk limits, off-street loading, lot sizes, street design, and other similar topics.

[1311] The 1997 HPS Redevelopment Plan establishes the land use standards for development in the Redevelopment Plan area. The 2004 Design for Development document outlines the design objectives, development standards, and urban design guidelines for projects developed in the Redevelopment Plan area.

Although the Project would commit the Project site to the proposed uses for future generations, it does not represent a change in commitment from the previously planned uses for the site, as described above. Further, the Project is essentially infill, replacing existing industrial, parking, and other underutilized uses with a Project that achieves a vision articulated by the City, the San Francisco Redevelopment Agency, and the community throughout a 30-year planning process. The Project would not represent a conversion of previously undeveloped open spaces to developed uses.

The Project was specifically designed to achieve the objectives stated under Proposition G and would be consistent with all of its population, employment, and housing policies. The Project would create economic opportunities for local businesses and residences by adding jobs, retail uses, and community services. The Applicant has committed to developing at least 3,345 units of the 10,500 units proposed with public housing (including rebuilding the Alice Griffith Public Housing complex at a one-to-one ratio), affordable housing, and below-market-rate housing. Units would range by size, type, and form consistent with the policies of Proposition G. Proposed development would occur at a level of density that would sustain local businesses and cultural amenities and would create a walkable environment. The Project would also fund infrastructure and transportation improvements needed to support such development. Therefore, while the Project would commit future generations to similar uses, the uses are consistent with and respectful of a thirty-year planning process.

Commitment of Nonrenewable Resources

Resources that would be permanently and continually consumed by Project implementation include energy (electricity and natural gas), water, and fossil fuels; however, the amount and rate of consumption of these resources would not result in significant environmental impacts related to the unnecessary, inefficient, or wasteful use of resources, as described below.

Energy

Energy use at the Project site would increase as a result of construction and operation of the Project. However, new buildings in California are required to conform to energy conservation standards specified in Title 24 of the *California Code of Regulations* (CCR). The standards establish "energy budgets" for different types of residential and nonresidential buildings and with which all new buildings must comply.

The Project Applicant has committed to including Project design features that would achieve 15 percent more energy efficiency than required by the 2008 Title 24 standards (refer to Section III.H [Air Quality], Section III.Q [Utilities], and Section III.R [Energy] for a discussion of energy-saving Project features). The Project would also comply with the City's Green Building Ordinance, as required by Chapter 13C of the *Environment Code*. The ordinance requires newly constructed commercial buildings over 5,000 gross square feet (gsf), residential buildings over 75 feet in height, and renovations on buildings over 25,000 gsf to obtain credits under LEED® or other green building standards.

The Project Applicant has committed to constructing all Project buildings to the LEED®ND Gold standard based on the Pilot Version of the rating system released in June 2007.[1312] Although energy savings associated with these programs could vary based on the credits chosen and, therefore, cannot be accurately

[1312] Since the initial release of this standard, the rating system has undergone two public comment periods, and several credit requirements have changed. The LEED® ND rating system is currently being finalized for formal release by the USGBC.

quantified, additional energy savings are anticipated. Pursuant to achieving the LEED® ND Gold standard, the Project would be required to implement measures that would directly or indirectly result in reduced energy consumption. Such measures include design features for high performance glazing, shading, envelope optimization, reflective roofs, and natural ventilation (reducing energy use for heating and cooling), natural and energy efficiency lighting (reducing energy for artificial lighting), reduced water consumption (reducing energy use associated with the conveyance of water and wastewater), and energy commissioning, a process that requires verification, monitoring, and regular maintenance of energy systems to achieve peak performance. Energy savings associated with this program could vary based on the credits chosen and associated energy-saving measures implemented. Therefore, the savings cannot be quantified at this time, although additional energy savings are anticipated.

Efficient energy use on the Project site would include energy-efficient building design strategies. Project buildings would be designed and sited to maximize solar gain and minimize heat-reflective surfaces, as well as provide landscaping to reduce heat reflection on adjacent structures. ENERGY STAR appliances would be installed by builders in the residential units, a measure aimed at reducing residential electricity consumption, which is a land use with high energy consumption rates. Refer to Section III.R for a discussion of energy.

In addition, the Project Sponsor would implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity; the use of solar thermal energy to provide space cooling with the use of absorption systems; and/or water for space heating and domestic water systems.

The Project would utilize water-conserving plants in the landscape plan, as well as drip irrigation in planter beds and the use of new or relocated mature trees (if feasible), which require less water than younger specimens. Shrub plantings and/or drought-tolerant groundcover would be utilized to minimize the use of large expanses of turf.

Compliance with all applicable building codes, as well as Project mitigation measures and other design features of the Project that are determined through the Design for Development process, would ensure that natural resources are conserved or recycled to the maximum extent feasible. It is also possible that new technologies or systems would emerge, or would become more cost-effective or user-friendly, that would further reduce the Project's reliance upon nonrenewable natural resources. Even with implementation of conservation measures, consumption of natural resources, including electricity and natural gas, would generally increase with implementation of the Project. However, the Project would not involve the wasteful, inefficient, or unjustifiable use of energy resources.

Water

In terms of potable water, implementation of the Project would generate a total of demand of approximately 1.68 million gallons per day (mgd) based on an estimate of historical benchmark demand, adjusted to account for current *California Building Code* and the requirements of the San Francisco Green Building Ordinance, which would require the installation of ultra-low flow fixtures, use of high-efficiency building equipment, efficient landscape irrigation techniques, and provision of water-efficient plant materials. As current water use from existing land uses at the Project site is approximately 0.3 mgd, the net effect of the Project on water demand would be an increase of approximately 1.38 mgd.

While potable water use would increase, the Project would be subject to various water-conservation measures that are being implemented by the San Francisco Public Utilities Commission (SFPUC). The SFPUC's demand management programs range from financial incentives for plumbing devices to improvements in the distribution efficiency of the system. The conservation programs implemented by the SFPUC are based on the California Urban Water Conservation Council's list of fourteen Best Management Practices (BMP) identified by signatories of the Memorandum of Understanding Regarding Urban Water Conservation in California, executed in 1991.

In addition, the SFPUC is increasing its water-conservation programs in an effort to achieve new water savings by 2018. This program is based on the 2004 San Francisco Retail Water Demands and Conservation Potential Report[1313] (Demand Report) that identified potential water savings and implementation costs associated with a number of water conservation measures. These new conservation programs include high-efficiency toilet replacement in low-income communities and water-efficient irrigation systems in municipal parks. With this expanded conservation program, the SFPUC anticipates reducing gross per household consumption (which includes both residents and non-residents) from 91.5 gallons per day (gpd) to 87.4 gpd by 2018, which would result in a conservation supply potential of approximately 4.0 mgd annually. Refer to Section III.Q for a discussion of water.

While the consumption of water would increase as the result of construction and operation of the Project, the Project would voluntarily and/or by directive be subject to water-conservation measures that would serve to reduce water use. The Project would not involve the wasteful, inefficient, or unjustifiable use of water resources.

Fossil Fuels

Construction and operational activities related to the Project would also result in the irretrievable commitment of fossil fuels for automobiles and construction equipment. The use of fuels resulting from Project-related travel to and from the Project site would be considerably higher than under existing conditions, and the construction schedule of the Project would be lengthy (approximately 20 years), which would result in a large increase in consumption of fossil fuels. However, this consumption would not be wasteful because (1) the Project proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) the Project would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips; and (3) the Project would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths.

The Project would be an infill project within a developed urban area that would provide access to employment, retail, and recreational opportunities. The VMT for the Project anticipates shorter and fewer trips as a result of the proposed density and mixed uses at the Project site.

As a result of these Project features and programs, between 28 and 34 percent of the weekday AM and PM peak hour person trips would be internal pedestrian trips within the Project site, according to the Transportation Study (Appendix D).[1314] Of the remaining external trips, 21 percent would be conducted

[1313] Hannaford and HydroConsult, *City and County of San Francisco Retail Water Demands and Conservation Potential*, 2004.
[1314] CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*, 2009.

via transit and 3 percent would be conducted via bicycle.[1315] The shift to non-vehicular modes of travel would result in savings in transportation fuels. Over time, implementation of the State Alternatives Fuels Plan (see Regulatory Framework) is expected to increase the efficiency of vehicle trips, result in the development of alternative fuels, and shift trips to non-vehicular modes of travel. Project programs, in combination with local and State policies, would minimize vehicular fuel use.

The programs proposed under the Project for minimization of trips, as well as the Project's density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. Therefore, the Project would not be wasteful with respect to petroleum fuel consumption.

V.E EFFECTS NOT FOUND TO BE SIGNIFICANT

All impacts associated with agricultural resources and mineral resources have been determined to be "Effects Not Found to Be Significant" according to Section 15128 of the CEQA Guidelines, and are not addressed in this EIR for the reasons described below.

Agricultural Resources

The Project Site is located in the City of San Francisco, an urban area, and therefore not agricultural in nature. The California Department of Conservation designates no land within the City boundaries as Williamson Act properties or important farmland.[1316] The proposed Project would not convert farmland to a non-agricultural use, would not conflict with agricultural zoning or Williamson Act contracts, or cause other changes that would lead to the conversion of Farmlands of Statewide Importance to nonagricultural use. Accordingly, because no agricultural resources are located on or near the Project site, no impacts would occur. Therefore, no further analysis of this issue is required in the EIR.

Mineral Resources

All land in San Francisco, including the Project Site, is designated Mineral Resource Zone 4 (MRZ-4) by the California Division of Mines and Geology (CDMG) under the Surface Mining and Reclamation Act of 1975 (CDMG, Open File Report 96-03 and Special Report 146 Parts I and II). This designation indicates that there is inadequate information available for assignment to any other MRZ and thus the site is not a designated area of significant mineral deposits. Since most of the Project site is already developed, future evaluation or designation of the site would not affect or be affected by the proposed Project. There are no operational mineral resource recovery sites in the project area whose operations or accessibility would be affected by the construction or operation of the proposed Project. No effects to mineral resources of value to the region or the State would occur, and no further analysis of this issue area is required in the EIR.

[1315] CHS Consulting Group, Fehr and Peers, and LCW Consulting, *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*, 2009.

[1316] San Francisco is identified as "Urban and Built Up Land" on the California Department of Conservation *Important Farmland of California Map,* 2002. This map is available for viewing on-line at the Department of Conservation website (http://www.consrv.ca.gov/DLRP/fmmp/images/fmmp2004_11_17.pdf), accessed for this report February 15, 2007.

V.F IRREVERSIBLE DAMAGE

For this Project, irreversible damage resulting from environmental accidents is limited to the potential for the risk of upset associated with the use, transport, or storage of hazardous materials during construction or operational activities, or associated with any potential remediation activities as part of the shoreline improvements. Section III.K of this EIR fully discloses and evaluates all potential impacts associated with the use, transport, or storage of hazardous materials during construction or operational activities involving hazardous materials, or associated with any potential remediation activities as part of the shoreline improvements. Compliance with federal, state, and local regulations pertaining to hazardous materials, as outlined in mitigation measures contained in Section III.K, would ensure this impact would be less than significant. Therefore, there would be no significant irreversible effects that would occur as a result of construction or operational activities involving hazardous materials or associated with potential remediation activities as part of the shoreline improvements.

V.G DIRECT OR INDIRECT ECONOMIC OR POPULATION GROWTH

As required by the CEQA Guidelines, an EIR must include a discussion of the ways in which the Project could directly or indirectly foster economic or population growth or the construction of additional housing and how that growth would, in turn, affect the surrounding physical environment (CEQA Guidelines Section 15126.2(d)).

Growth can be induced in a number of ways, including the elimination of obstacles to growth or through the stimulation of economic activity within the region. The discussion of removal of obstacles to growth relates directly to the removal of infrastructure limitations or regulatory constraints that could result in growth unforeseen at the time of Project approval.

In general, a project may foster spatial, economic, or population growth in a geographic area if it meets any one of the criteria identified below:

- The project establishes a precedent-setting action (e.g., a change in zoning or general plan amendment approval)
- The project results in the urbanization of land in a remote location (leapfrog development)
- The project removes an impediment to growth (e.g., the establishment of an essential public service, or the provision of new access to an area)
- Economic expansion or growth occurs in an area in response to the project (e.g., changes in revenue base, employment expansion, etc.)

If a project meets any one of these criteria, it may be considered growth inducing. Generally, growth-inducing projects: (1) are located in isolated, undeveloped, or underdeveloped areas, necessitating the extension of major infrastructure, such as sewer and water facilities or roadways; or (2) encourage premature or unplanned growth.

Precedent-Setting Action

The Project site is part of the larger Bayview Hunters Point neighborhood, an area characterized by well-established residential neighborhoods, commercial uses, and industrial areas. The *Bayview Hunters Point Area Plan* (BVHP Area Plan) is an adopted component of the *San Francisco General Plan* that serves as a guide to the future development of the BVHP community.[1317] This plan, based on many years of continued citizen input, seeks to provide guidelines for realizing the area's growth potential in a manner that is in the best interest of the local residents and the City as a whole.

The existing General Plan land use map designates properties within the Project site as Candlestick Point Special Use District, Residential, Mixed Use, Parks and Open Space, and Public Facilities. These land use categories reflect Proposition F (1997), which amended the General Plan, *Planning Code*, and Zoning Map, and established the Candlestick Point Special Use District to accommodate the development of a stadium suitable for professional football and a shopping and entertainment center with open space and related parking facilities as principal uses, as well as other conditional uses, such as residential uses, subject to the approval of the Planning Commission. For land use designations within the Hunters Point Shipyard, the BVHP Area Plan, General Plan, and zoning code defer to the Hunters Point Shipyard Redevelopment Plan.

The Project as proposed includes a General Plan amendment to establish a land use designation and specify the land uses that are allowable within this new designation consistent with the approved land use and development plan specified in Proposition G and corresponding amendment to the BVHP Area Plan. The General Plan Amendment and amendment to the BVHP Area Plan would not set a precedent by allowing uses that are not found elsewhere within the City or even the area. The proposed designation would be consistent with the nature of on-site and surrounding development. Implementation of the amendments would allow for continued use of existing development, while also permitting mixed uses. Therefore, the Project would not be growth inducing as a result of establishing a precedent-setting action.

Leapfrog Development

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be a potential for development at the Project site to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the Project site are built out, except for sites such as Executive Park or India Basin that are currently undergoing redevelopment or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Removal of an Impediment to Growth

The Project is located in an urbanized area that is served by an existing network of electricity, water, sewer, storm drain, communications, roadways, and other infrastructure sized to accommodate or allow existing

[1317] San Francisco Planning Department, *San Francisco General Plan*, *Bayview Hunters Point Area Plan*, March 2006. The Area Plan, formerly named the *South Bayshore Area Plan*, was adopted in February 1970 (Board of Supervisors Resolution No. 6486). Subsequently, the Area Plan was updated in July 1995 (Resolution No.13917). The current 2006 Area Plan was renamed the *Bayview Hunters Point Area Plan* at the community's request to reflect its historic name for itself.

and planned growth. Infrastructure and services would be expanded to serve the Project, but it would not encourage additional local growth beyond that already planned under Proposition G (for the Project site) and under the redevelopment plans. The Project would replace aging and deteriorated infrastructure on the Project site, as well as infrastructure on HPS Phase II that is no longer in use. New on-site infrastructure would be constructed, some of which would connect to the existing off-site Combined Sewer System infrastructure, and some of which would be a new, separate system for on-site stormwater treatment. The Project would not expand infrastructure to geographic areas that were not previously served. The Project would create a new street grid that would improve access to the shoreline and connect the Project with existing neighborhoods. However, the Project would not create new transportation access to an area that was previously inaccessible, as the Project site is currently accessible. The infrastructure needed to support the level of growth anticipated under the Project was planned based on population projections that included the housing and employment associated with the Project. The infrastructure would not encourage new development (other than the Project), as the new on-site infrastructure would connect to an existing City system. The existing lack of adequate infrastructure on the Project site has not acted as an impediment to growth, as the Project site is immediately adjacent to off-site City infrastructure and new development could easily establish connections with that system.

Economic Expansion or Growth in Response to the Project

While the Project itself represents growth, the provision of new housing and employment opportunities would not indirectly encourage substantial new growth in the City that has not previously been projected. It would provide much-needed housing within the City to accommodate an extensive workforce from throughout the Bay Area. It would provide substantial employment opportunities in an area that historically has had few employment opportunities, and the new employees would be anticipated to be drawn from the Bay Area workforce, including the local workforce.

The Bay Area is a major employment center, with over 3.2 million jobs reported in 2005.[1318] A large percentage of this employment is in San Francisco. As shown in Table III.C-3 (Existing Employment [2005]) of Section III.C (Population, Housing, and Employment), there were approximately 553,090 jobs in the City in 2005, approximately 17 percent of the total regional employment. At the time of the 2000 Census, about 55 percent of the workers holding jobs in San Francisco lived in the City, while the remaining 45 percent lived in other jurisdictions.[1319] For this reason, the daytime population associated with local employment substantially exceeds the residential (nighttime) population. Estimated City employment for 2030 would be approximately 748,100 jobs.[1320]

As discussed in this EIR in Chapter I (Introduction) and Chapter II (Project Description), Proposition G encourages development of Candlestick Point and HPS with a mixed-use project that was defined in the Proposition as including park and open space improvements, approximately 10,000 homes for sale or rent, about 700,000 gsf of retail uses, about 2,150,000 gsf of "green" office, science and technology, research and

[1318] Association of Bay Area Governments, *Projections 2007,* 2006.
[1319] US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006. It should be noted that a certain percentage of San Francisco residents also commute to other communities.
[1320] Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009. This number includes employment projections associated with the Project.

development, a ferry terminal and marina, an arena/performance venue, an arts center, and a site for a new San Francisco 49ers stadium. Proposition G states that the proposed development should, among other objectives, create a range of job and economic development opportunities for local, economically disadvantaged individuals and business enterprises, particularly for residents and businesses located in the BVHP area, and create substantial jobs and commercial opportunities for existing Bayview residents and businesses. The Project would fulfill all of the objectives of Proposition G and would be consistent with its policies.

Development of the Project would transform a currently underutilized and blighted area of the City into a vibrant mixed-use development with substantial housing and job opportunities. The new households would create a corresponding demand for goods and services, which are expected to be accommodated by the Project's non-residential uses. Because the Project provides a balance of housing and commercial uses and would accommodate new residents' needs for such goods and services, the increase in City population would not be expected to induce substantial commercial growth elsewhere in the City. Similarly, the proposed housing could accommodate the increase in employment on site. The combination of land uses in the Project would function to increase retail and commercial sales and activities within the City, as well as enhance the economic viability of the Project area. The creation of new commercial activities and housing would contribute to the economic vitality of the City, which would enable the continued provision of high-quality services and programs for residents and businesses and would contribute to a larger municipal revenue stream. The revitalization of the Project site and the increased connectivity and public access to shoreline amenities at Candlestick Point and Hunters Point could encourage already planned growth in the adjacent neighborhoods, such as at India Basin.

Construction employees would be required to construct the Project. The number of construction employees would vary depending upon the phase of construction, but would range from 30 employees at the end of construction activities to a maximum of about 455 employees during the most labor-intensive phase of construction. Current Agency policies regarding contracting and employment seek to maximize local hiring for construction. It is anticipated that out-of-area construction employees would commute from elsewhere in the region, rather than relocate to the San Francisco area for a temporary construction assignment. In addition, due to the nature of construction activities, the employment opportunities resulting from construction-related work assignments are not considered permanent. Construction-related activities would, therefore, have a negligible impact on population and housing resources.

Development at the Project site would provide 10,730 permanent jobs by 2030. Regional employment in 2005 consisted of 3.2 million jobs, with a projected increase of approximately 1.7 million jobs to 4.9 million jobs in 2030. San Francisco has traditionally experienced, and would continue to experience, ample employment opportunities that are not met by an equal supply of housing within the City, or even the Bay Area. The Project's contribution of 10,730 permanent jobs would represent 0.6 percent of the anticipated increase in regional employment through 2030 and is within the employment growth forecasts for both the City and the County.

The Project would provide increased tax revenues to the City. The positive revenue stream may result in the creation of indirect and induced jobs. Indirect jobs are those that would be created when the future owners and/or managers of the retail-commercial uses purchase goods and services from businesses in the region, and induced jobs are those that are created when wage incomes of those employed in direct and indirect jobs are spent on the purchase of goods and services in the region. The City's economic impacts

are primarily the result of purchases of goods and services, as well as payment of taxes and salaries, which affects the regional economy of the City and County, and, on a more indirect basis, California. Therefore, the positive revenue stream and the resulting increased economic viability of the Project site could result in indirect growth-inducing impacts.

However, the Project would implement a number of smart-growth principles, including:

- Mixed uses that promote living and working in the same area to limit vehicle miles traveled
- Uses oriented around existing and proposed transit to discourage use of the personal vehicle
- Transit connectivity so other City residents can take advantage of the opportunities offered by the Project
- Pedestrian and bicycle pathways to encourage these alternative methods of transportation
- Bicycle racks and pedestrian seating in prominent locations to encourage walking and cycling activities
- A mix of recreational uses to provide for the recreational needs of the community

Implementation of these features would limit indirect growth-inducing impacts by providing all necessary services within one development. Provision of most, if not all, needed services and amenities within the Project would reduce the need to develop such uses elsewhere in the City.

V.H URBAN DECAY

Secondary land use effects can also include economic and social changes. Economic and social changes are not in themselves significant impacts on the environment; however, a physical change in the environment caused by economic and social factors attributable to a development could sometimes result in a reasonably foreseeable indirect environmental impact, such as urban decay or deterioration. Urban decay results from land use decisions that cause a chain reaction of store closures and long-term commercial vacancies, ultimately destroying existing neighborhoods and leaving decaying shells in their wake.[1321] Urban decay can be defined as, among other characteristics, multiple visible symptoms of physical deterioration that invite vandalism, loitering, and graffiti that is caused by a downward spiral of business closures and long-term vacancies. The physical deterioration to properties or structures is so prevalent, substantial, and lasting for a significant period of time that it impairs the proper utilization of the properties and structures, and the health, safety, and welfare of the surrounding community. The manifestations of urban decay include such visible conditions as plywood-boarded doors and windows, parked trucks and long-term unauthorized use of the properties and parking lots, extensive tagging, graffiti, and offensive words painted on buildings, dumping of refuse on site, overturned dumpsters, broken parking barriers, broken glass littering the site, dead trees and shrubbery along with weeds, lack of building maintenance, homeless encampments, and unsightly and dilapidated fencing.[1322]

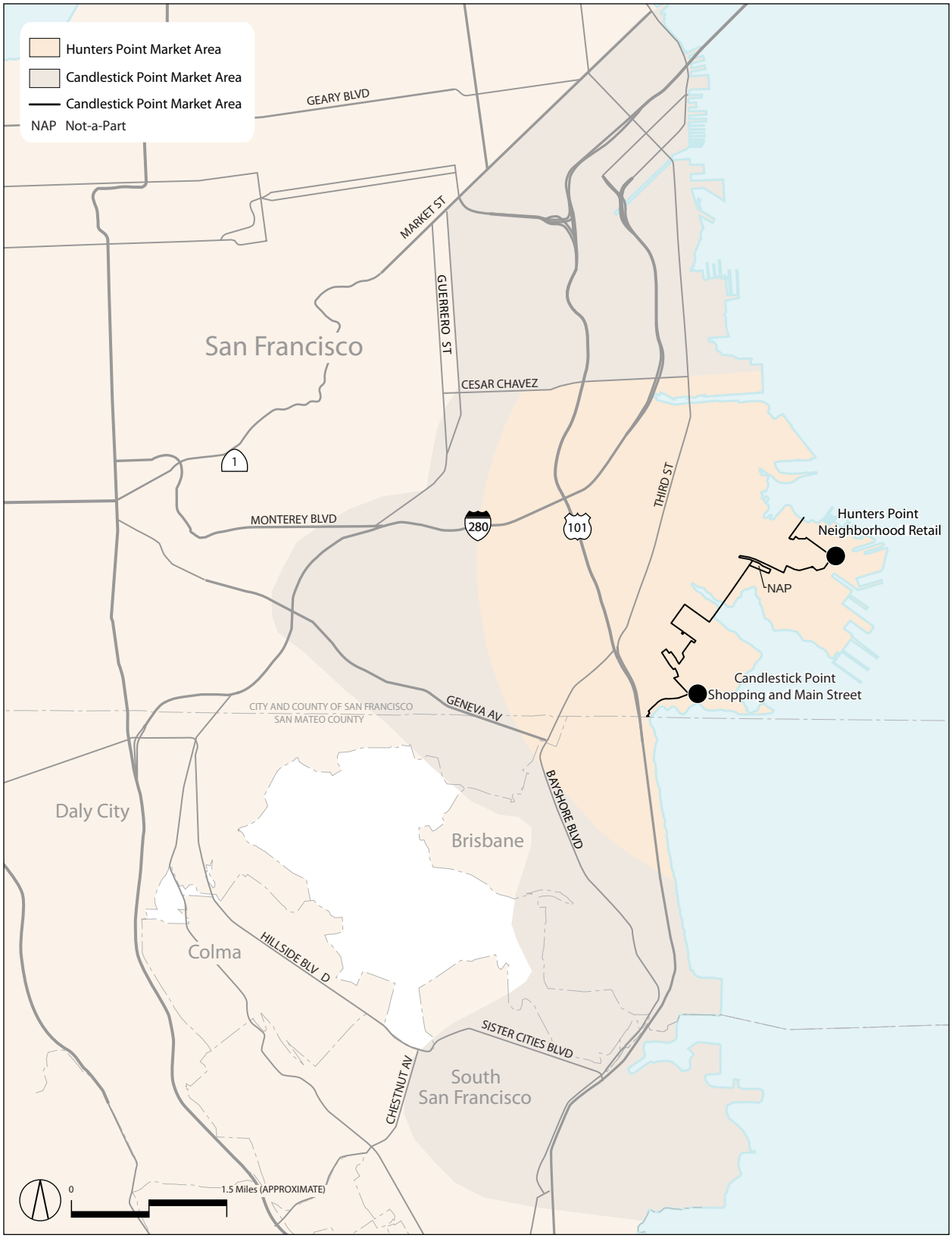
In order to analyze whether the Project could result in a significant indirect environmental impact of urban decay or deterioration in an identified market region, an analysis of potential secondary land use effects

[1321] *Bakersfield Citizens for Local Control v. City of Bakersfield, et al.*, 124 Cal. App. 4th 1184; 22. Cal. Rptr. 3d 203; 2004 Cal. Daily Op. Service 10918; 2004 Daily Journal DAR 14768.
[1322] CBRE Consulting, September 2009.

was prepared by CBRE Consulting (Appendix U) to assess the existing retail commercial market in relation to the Project, including potential impacts on local retailers. The analysis focuses on determining if the Project and the identified cumulative projects would directly or indirectly cause any existing retailers to close, and, of so, whether the subsequent vacancies would remain vacant for a prolonged period of time such that they develop the symptoms described that contribute to and eventually lead to urban decay. CBRE Consulting's analysis of the local retail market was based on a range of research and background resources. First, the firm has completed numerous real estate research projects in the San Francisco Bay Area and is generally familiar with the characteristics of the geographic areas covered in this study. Second, CBRE Consulting conducted field research of the major regional and neighborhood shopping nodes in southeastern San Francisco and nearby cities in May 2009 to gain a better understanding of current market conditions including shopper volumes, the level of retail vacancy, and the general condition of local retail properties. Various commercial databases, including Claritas and CoStar, informed this fieldwork by providing background on the larger shopping centers and retail businesses in the area. Moreover, taxable retail sales data from the California Board of Equalization (BOE) and information on sales tax collections from the City of San Francisco complemented the field research by providing a view of the relative performance of retail categories within specific geographic areas. Third, CBRE Consulting contacted local economic development and planning officials to understand their views on shopping patterns and the strengths and weaknesses of individual retail areas. Several prior research studies, including a January 2008 report prepared by Irwin Development Group for the Project and a Seifel Consulting May 2009 Draft report prepared for the San Francisco Redevelopment Agency on the Bayview Hunters Point Redevelopment Area offered additional background for this analysis.[1323]

The CBRE Consulting retail analysis is the source of the analysis of potential Project impacts on urban decay. The CBRE Consulting study considers the primary trade areas, or retail market areas, for the retail components of the Project based on the location of the Project and other retail commercial areas and shopping centers and the population and income characteristics of the area (Figure V-1 [Retail and Commercial Market Areas]). Industry sources such as ICSC and ULI were first consulted to determine what factors are most indicative of trade area boundaries for regional shopping centers. ICSC defines the typical market area for regional shopping centers as being within a 5- to 15-mile radius. San Francisco has a relatively small geography with a dense urban population. Because of this and the hilly topography of San Francisco, it was determined that a simple radius would be unrealistic and would not reflect the realities of how long it takes to drive from one point to another. Instead, the market area was determined primarily through drive-time analysis. In addition, although an estimated 12 percent of all retail trips to the Project are expected be generated by public transit or bicycling, the drive-time estimates are viewed as a reasonable approximation of the accessibility of the Project's retail areas. For purposes of this analysis, the Candlestick Point retail market area is roughly an area that is within a 15-minute drive of the planned regional center.[1324] The market area defined for the HPS Phase II component is for the most part a 3-mile radius. This boundary roughly corresponds with a 10-minute drive time.[1325]

[1323] See "Retail Market Analysis for Candlestick Point, San Francisco, California, January 2008," Irwin Development Group, and "Bayview Hunters Point Redevelopment Plan Amendment, Existing Conditions Report, May 2009 Administrative Draft," prepared for the San Francisco Redevelopment Agency by Seifel Consulting.
[1324] CBRE Consulting, September 2009.
[1325] CBRE Consulting, September 2009.



SOURCE: CB Richard Ellis, Inc, 2009.

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FIGURE V-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

RETAIL AND COMMERCIAL MARKET AREAS

CBRE developed a statistical regression-based model to estimate retail spending potential for a market area based on household counts, income, and consumer spending patterns. The model determines the extent to which a designated market area is or is not capturing its sales potential based on reported taxable sales data. In California, these data are generally published by the Board of Equalization (BOE) or provided by municipal tax consultants. In order to estimate the impact of the planned retail centers to the existing retail sales base, CBRE first allocated the retail by component into the retail categories used by the BOE, which facilitates a direct comparison of the projected Project retail sales to the existing sales in the market areas.

Some space at each of the Project's retail areas is allocated to non-retail tenants, which include bank branches, business services (e.g., tax preparation, real estate offices), and personal services such as hair and nail salons and dentist offices. Since revenues for these types of tenants are not tracked by the BOE, the analysis uses broader retail demand growth (based on projected new households and BOE-based sales estimates) as a proxy for the likely demand for non-retail services. In other words, if future demand from new household growth is high enough such that substantial retail sales impacts are not anticipated, then the related demand from new households should also be sufficient to support services-oriented tenants in the Project's retail areas as well. The sales estimates are for retail tenants only, as defined by the BOE classifications.

For analytic purposes, CBRE developed an estimate of the existing sales base, starting with actual annual sales data from 2007. This base was then adjusted to a 2009 estimate, with further adjustments reflecting expectations regarding the characteristics of the existing base by 2030. Retail categories in which spending is not fully captured are called "leakage" categories, while categories in which more sales are captured than are generated by market area residents are called "attraction" categories. Generally, attraction categories signal particular strengths of a retail market, while leakage categories signal particular weaknesses. The CBRE report analyzes the retail sales leakage and attraction profile of the market areas, meaning the extent to which market area stores capture retail spending from market area households as well as from households located outside the market area. It provides a quantitative measure of the market area's sales performance. CBRE's approach to assessing the potential for urban decay is grounded in this analysis, focused on determine if the Project and identified cumulative projects would directly or indirectly cause any existing retailers to close, and if the subsequent vacancies would remain vacant for a prolonged period of time such that they develop the symptoms of urban decay described above.

- While the first new retail may open as early as 2019, full build-out is expected to be completed in 2027. It is assumed that if the retail planned for the Project would add sales to a retail category in an amount greater than the combination of estimated recaptured leakage in the category and the expected demand from new households, at worst the remaining amount of sales would be diverted away from existing market area retailers. This Section discusses potential sales impacts to existing stores that are located inside the defined market areas and outside but near the two respective market areas as a result of potential changes in shopping patterns that could occur after the opening of the Project's retail components. For further details of the assumptions of the market analysis, please refer to Appendix U and its Exhibits.

Baseline Data

The San Francisco retail base is substantial, and the extent to which it can absorb the Project's planned retail areas without over-saturating the market and contributing to potential store closures and urban decay

is dependent on many complex market factors. These factors include the size and strength of San Francisco's retail inventory, the characterization of San Francisco as a retail hub, the performance of key retail submarkets, the historic ability of the market to back-fill vacancies, and the demonstrated level of retailer interest in establishing new operations in San Francisco. As a regional center, San Francisco also draws large numbers of commuting employees from surrounding areas, who also contribute to the City's retail sales attraction. For example, the Metropolitan Transportation Commission, the transportation planning agency for the nine-county Bay Area, estimated that San Francisco's net in-commute (i.e., total employment less employed residents) was 171,544 employees in 2006 and projected that this figure would increase to 314,073 employees by 2035.[1326] This net inflow contributes to restaurant sales, purchases at downtown shopping areas, and stops at shopping centers along major traffic routes. In 2008, the San Francisco Convention & Visitor Bureau estimates that 16.4 million visitors to San Francisco spent $3.6 million on restaurants, general merchandise, apparel, gas/auto services, and miscellaneous retail.[1327] That comprises a large portion of San Francisco's previous year's total annual taxable sales of $10 billion. Total leasable space in San Francisco is approximately 3.8 million square feet.[1328] Total retail sales tax collected for 2007 was $117 million. The largest spending category is restaurants, comprising 21 percent of total retail sales tax, an unusually large share compared to the average of 13 percent of total taxable sales statewide.[1329]

San Francisco's sales are concentrated in the eating and drinking places category (i.e., restaurants) and among other retail establishments, which include office supplies, computer stores, jewelry, sporting goods, and miscellaneous retail. The sales share for apparel stores (10.3 percent of the total) is also high, especially when compared with the statewide average of 3.7 percent, whereas the shares for motor vehicles and parts, service stations, and building materials are relatively low.[1330] San Mateo County, by contrast, offers a much more representative mix of retail when compared with the rest of the state since there are more areas devoted to car dealers and "big box"-type stores. Within San Mateo County, the cities of Daly City and San Bruno host regional-serving retail primarily at Westlake Shopping Center, Serramonte Center, and the Shops at Tanforan, though these two cities still capture a relatively small share of overall purchases among the two counties.

CBRE Consulting also evaluated data provided by the City of San Francisco showing the annual sales tax collections by retail category for 2003-2008, which are prepared by MuniServices, a municipal tax consulting firm. The 2008 sales tax information presents a more current picture of retail activity in San Francisco and reinforces the findings about the mix of retail that were apparent in the BOE figures. Total retail sales tax collected for 2008 was $117.0 million, which reflects San Francisco's percentage share of overall sales tax collections. Another advantage of the MuniServices information is that it includes subsets of the data for several neighborhood retail districts within San Francisco, including South Bayshore, which substantially overlaps with the HPS Phase II market area and also accounts for a large Section of the

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[1326] See "Travel Forecasts Data Summary: Transportation 2035 Plan for the San Francisco Bay Area, December 2008," Metropolitan Transportation Commission; (http://www.mtc.ca.gov/maps_and_data/datamart/forecast/).
[1327] San Francisco Convention & Visitor Bureau, *Total Direct Visitor Spending within San Francisco: 2008*.
[1328] CBRE Consulting, September 2009.
[1329] CBRE Consulting, September 2009.
[1330] See *Taxable Sales In California (Sales & Use Tax) During 2007*, Table 1, California Board of Equalization website (http://www.boe.ca.gov/news/pdf/ts_a07.pdf).

Candlestick Point market area. Sales tax data for the Third Street corridor (a subdistrict within South Bayshore), San Bruno Avenue, and Leland Avenue serve as further indicators of the mix and level of the retail activity in the southeastern Section of San Francisco. Table 6 presents the sales tax collections for South Bayshore and the other relevant retail districts tracked within the MuniServices data. Since the Third Street corridor appears to be fully within the South Bayshore boundaries, these areas in total provide about 13 percent of the taxable retail purchases in the City.

The market area for the Candlestick Point regional center contains one primary retail district—South Bayshore—that could potentially be impacted by the opening of the Project's retail components. There are also three sub-district corridors in the Candlestick Point market area: Third Street, San Bruno Avenue, and Leland Avenue. The South Bayshore area accounts for the majority of taxable retail activity in these parts of San Francisco. In addition, unlike the City as a whole, the categories of building materials, service stations, and motor vehicles and parts are particularly strong, each comprising at least a third of San Francisco's overall taxable sales in these sectors. The South Bayshore district showed 2008 taxable retail sales totaling $1.3 billion. This corresponds to $13.5 million in sales tax revenue, which represents approximately 11.5 percent of San Francisco's total sales tax collected for 2008. The Third Street corridor, a subset of the South Bayshore retail district, is an emerging transit-oriented area following the introduction of a new light rail line along Third Street in 2007. The construction of the Third Street line included a mix of infrastructure improvements such as new sidewalks, lights, and benches. Comprising only 2.2 percent of total San Francisco retail sales tax, with taxable retail sales totaling $258.1 million and sales tax of $2.6 million, the largest taxable retail category in the Third Street corridor is building materials. Gas stations and restaurants are the next two biggest taxable categories. Taxable retail sales totaled $258.1 million and sales tax $2.6 million for this sub-district in 2008. San Bruno Avenue is a small retail district located just to the southwest of where Highway 101 crosses Interstate 280. The retail area is primarily an 8- to 10-block stretch of gas stations, shops, restaurants, and service-oriented businesses between Hale Street on the northern end and Paul Street to the south. A few of the intersecting streets are major thoroughfares that pass under elevated sections of the freeway, and there is a highway exit and on-ramp from San Bruno Avenue at Stillman Street. The retail properties in the area tend to be older and are in fair to moderate condition. The larger stores include Walgreens, a Kragen Auto Parts, and a few ethnic specialty food markets. Fast food chains and other convenience restaurants (pizza, taquerias, Asian take-out) are also common. While there were a few retail vacancies in the area, these were being marketed by landlords, and there were signs that older properties had been re-tenanted with new uses, (e.g., a former movie theatre that is now occupied by a church).The retail sales tax revenues in this corridor account for about 1.4 percent of total sales tax citywide. Gasoline stations contribute the highest share of the district's tax revenues, followed by restaurants, other retail, and motor vehicles and parts. This neighborhood also appears to have been served by a Cala Foods grocery store (1390 Silver Avenue) that has closed. CBRE Consulting visited this property during its field research in May 2009. At the time, the store was closed with a chain-link fence around the property, and no real estate brokerage signs were visible, which suggests that the property was not yet being marketed to new tenants.

Leland Avenue's retail district is the smallest of the four neighborhood shopping areas in the MuniServices data that CBRE Consulting analyzed, accounting for 0.1 percent of all retail sales tax collected in San Francisco. This shopping district, which is located within the Visitacion Valley neighborhood, has lower traffic volumes and a smaller mix of retail options than either the Third Street or the San Bruno Avenue

corridors. The four-block Section of Leland Avenue between Bayshore Boulevard and Cora Street has a Bank of America branch, a few small restaurants and produce stores, and some neighborhood services. This district also previously included a small grocery store, the Super Fair market, which was listed in a Claritas database of neighborhood businesses. However, during CBRE Consulting's field research in May 2009, this store building had been razed. Taxable retail sales totaled $13.2 million in 2008, with $131,733 collected in sales tax. Chart 5 below shows this district's sales tax by retail type in comparison to San Bruno Avenue. Sales tax in the Grocery category comprised about half of all retail sales tax in the Leland Avenue district, though it appears that there has also been a recent food store closure in the area.

As mentioned, the South Bayshore area, which is primarily south of Cesar Chavez Avenue and east of Highway 101 in San Francisco, comprises a large part of both the HPS Phase II and the Candlestick Point market areas. While the introduction of the Third Street light rail line has contributed to investment in this neighborhood, this Section of the city is largely within the Bayview Hunters Point Redevelopment Project Area. Specifically, Project Area B, as defined by the San Francisco Redevelopment Agency, encompasses most of the Third Street retail corridor.

Seifel Consulting prepared a recent mandated study of the Bayview Hunters Point Redevelopment Area for the San Francisco Redevelopment Agency. While the report highlighted several positive improvements in Project Area B including the planned development of a 15,000-square-foot Fresh & Easy grocery store and the potential opening of a Lowe's Home Improvement store, Seifel Consulting concluded that "Project Area B continues to suffer from unsafe and unhealthy buildings, inadequate circulation, lack of economic development, underutilized retail and commercial corridors, environmental impediments, problem businesses and a high crime rate."[1331] These conditions are indicative of economic and physical blight and are "substantial and prevalent"[1332] in Project Area B such that further redevelopment was recommended.

With regard to retail properties in particular, the Seifel report indicates that the two retail corridors in the area, Third Street and a Section of Bayshore Boulevard, have historically had higher vacancies than other areas of San Francisco due to the perception of crime in the area. One business, a Walgreens located on the corner of Third Street and Williams Avenue reportedly spends $15,000 per month on security measures and loses about $12,000 per month in merchandise theft. There are numerous mid-sized to large retail properties in Project Area B that have experienced long-term vacancies and have fallen into disrepair due to limited demand and existing rent levels that are reportedly too low to justify investments in building improvements. Specifically, the 50,000-square-foot former Goodman's Lumber store on Bayshore Boulevard has been vacant for almost a decade while the adjacent former Whole Earth Access store space has been closed for at least 13 years.[1333]

Further analysis by Seifel Consulting indicates that retail lease rates in the Project Area B are much lower than other neighborhood shopping districts in San Francisco due a range of factors:

> Bayview neighborhood commercial establishments struggle to attract desirable tenants due to the poor condition of buildings along Third Street, the high crime rate, and public improvement

[1331] "Bayview Hunters Point Redevelopment Plan Amendment, Existing Conditions Report, May 2009 Administrative Draft," prepared for the San Francisco Redevelopment Agency by Seifel Consulting, p. I-3.
[1332] Ibid., p. III-65.
[1333] Ibid., p. III-47; Note that redevelopment of the Goodman's Lumber store site has been planned for years and that Lowe's Home Improvement is currently evaluating the property as a new store location.

> deficiencies. Moreover, the ability to attract tenants is hampered by the lack of local brokers specializing in the area. Retail brokers tend to specialize in geographic areas with a concentration of retailers. The perception of the brokerage community is that the Bayview retail market is weak or non-existent for neighborhood serving retailers. The area will likely continue to struggle unless this perception is changed through redevelopment assistance.[1334]

The Seifel Consulting analysis of retail property conditions is consistent with CBRE Consulting's observations about the South Bayshore shopping districts. While there are some larger retailers such as Walgreens, Smart & Final, and a Foods Co. store, which had moderate shopper volumes, there are also sections of Third Street and Bayshore Boulevard with vacant store space that is not likely to be re-tenanted without substantial investment in improvements.

For the purpose of this analysis, CBRE Consulting calculated the retail sales base so that the magnitude of each component of the Project's impact on the market area could be measured against the existing base. While the analysis assumes the Project would not be fully operational until 2030, the sales base relevant to the analysis for CEQA purposes is the existing sales base, reflective of existing conditions. CBRE Consulting developed an estimate of the existing sales base, starting with actual annual sales data from 2007. This base was then adjusted to a 2009 estimate, with further adjustments reflecting expectations regarding the characteristics of the existing base by 2030. Sales base adjustment factors may include the opening of new shopping centers and stores, closure of retail stores that contributed to the 2007 sales base, changes in consumer preferences in retail spending, and residential growth in the area, which drives additional demand for retail goods. The Candlestick Point market area sales base is calculated to be $5.34 billion in 2007, but is adjusted to $5.30 billion in 2009. The HPS Phase II market area retail sales estimate was $554.1 million in 2007, adjusted to $534.8 million in 2009.[1335]

The Candlestick Point market area had a strong retail sales draw in 2007, to which sales were attracted in almost every retail category except Motor Vehicles and Parts. The market area can be characterized as fully meeting the retail needs of its residential population, as well as partially supporting the retail needs for households beyond the market area boundaries. These sales attraction and leakage findings (for the category stated) suggest that the market area is a retail destination supporting numerous shopping centers and retailers that draw from a consumer base far exceeding the market area's resident population.

Based on 2007 retail sales data, the HPS Phase II neighborhood retail market area had retail sales leakage, with 10.9 percent of residents' spending ($68.1 million) estimated to occur outside the geographic area. Despite overall retail sales leakage, food stores, home furnishings and appliances, and building materials had attraction. The defined market area for HPS Phase II had a net loss of retail sales, despite these three retail categories that attracted substantial retail sales from non-residents. Overall, the HPS Phase II market area can be characterized as not fully meeting the retail needs of its resident population. These sales attraction and leakage findings suggest that the market area is underserved by retail in most categories except for the three categories that experienced attraction.

[1334] Ibid., p. III-50.
[1335] CBRE Consulting, September 2009.

Candlestick Point Retail Sales Impacts

The Candlestick Point retail component would contain 635,000 sf of regional retail and an adjacent 125,000 sf of adjacent neighborhood retail and business services area. The regional center would be anchored by a 125,000 sf general merchandiser. Other anchors would be a 60,000 sf grocery store and a cinema. Large stores planned include those selling books, sporting goods, hardware, and electronics. Smaller stores would include 70,000 sf of apparel, a food court, sit-down restaurants, furniture and home furnishings, gifts, and specialty retail. A small portion of the space would be allocated to business and personal services stores such as banks, spas, and salons.

The CBRE Consulting report estimates that sales at the Candlestick Point regional center would total $190.6 million in 2009 dollars annually, with another $26.7 million at the adjacent neighborhood retail area. Sales at the Candlestick Point regional center would be concentrated in the "Other Retail Stores" category, which covers electronics/appliances, sporting goods, books, a cinema, and other specialty retailers, as well as the General Merchandise and Apparel Categories. The neighborhood retail planned adjacent to the regional center would include Restaurants, Other Retail Stores, a drug store, and some non-retail personal services and businesses.

CBRE Consulting calculated the assumed percentage of new demand within the market area that could be captured by the Candlestick Point regional center and neighborhood retail. These capture rates were developed based on comparing the share of the new development's projected sales to the total retail sales in the market area. As shown in Exhibit 34 of Appendix U, the 24,395 households added by 2030 are projected to generate $694 million in new retail demand spread across the BOE retail categories. The CBRE Consulting analysis determined that Candlestick Point market area retailers could reasonably expect to capture between 50 and 85 percent of the new household demand, depending on the retail category (refer to Exhibit 34 of Appendix U). Applying these capture rates, Candlestick Point market area retailers would capture up to $284.6 million in sales generated by the new market area residents. Further applying these capture rates for this portion of the Project, $11.0 million in new household demand is likely to be captured by the planned Candlestick Point regional center and neighborhood retail stores. This comprises approximately 4.0 percent of all available market area captured sales. Remaining demand would be available to offset sales diverted from existing retailers as a result of the Candlestick Point development achieving its projected level of sales. The $246.3 million in new household demand captured within the market area would be available to offset any potential impacts (Market Area Sales Captured minus Estimated Capture of Demand from New Households minus New Demand Captured by HPS Phase II Retail minus Other Demand Captured by Offsetting Impacts in HPS Phase II Market Area; refer to Exhibit 34 of Appendix U).

Another source of potential retail demand for new retail projects can be recaptured sales leakage from resident spending that is occurring outside the Candlestick Point market area. However, the Candlestick Point market area has retail sales leakage in only one category, Motor Vehicles and Parts. This category is not relevant to the analysis, since no motor vehicles and parts retailers are planned for the regional center or neighborhood retail area. Exhibit 35 of Appendix U shows that no potential leakage from the market area that would be available to absorb sales at the new retail planned for Candlestick Point.

New demand associated with household growth is estimated to account for $11.0 million of the Project's projected $173.2 million in market area sales (refer to Exhibit 35 of Appendix U). The remaining $246.3 million in demand from new households would be distributed among other market area stores, such that potential impacts to existing stores would be at least partially offset. Remaining impacts are estimated in the Apparel Stores and Other Retail Stores categories. However, as a share of the market area sales, these impacts are only 2.3 percent in Apparel and less than 1.0 percent in the Other Retail Stores category. There is also still a large amount of remaining demand in the General Merchandise, Food Stores, Restaurants, and Building Materials categories. If any Apparel retailers or Other Retail Stores were to close due to development at Candlestick Point, there appears to be sufficient demand for a store in a different retail category to re-tenant the space. Therefore, no substantial impacts to the detriment of existing retailers in the Candlestick Point market area, including retailers on Third Street, Leland Avenue, and San Bruno Avenue, are estimated to lead to prolonged vacancies as a result of the Candlestick portion of the Project.

CBRE Consulting also identified seven regionally oriented shopping centers in San Francisco, Daly City, San Bruno, and San Mateo, which are potentially competitive with the planned regional center at Candlestick Point. Six of these centers were analyzed through field research, and background on these properties is presented below. The seventh center, Hillsdale Shopping Center in San Mateo, was considered too distant to merit a field visit, though this shopping area was included in the analysis.

These seven centers range in size from 569,049 square feet to 1,250,000 square feet, with an average of about 850,000 square feet. Exhibits 39 through 41 of Appendix U map the locations of each of these shopping centers in comparison with the Candlestick Point regional market area. Estimated trade areas and trade area overlaps with the Candlestick Point market area are shown for three representative centers: Westfield San Francisco Centre, the Shops at Tanforan, and Westlake Shopping Center. CBRE Consulting calculated the number of households within each of the three regional shopping centers' respective trade areas and the degree of overlap with the Candlestick Point market area. Trade area estimates range from 167,447 to 303,645 households for each of the three centers. Estimating the potential diversion of the existing consumer base based on the assumption that up to one-half of the trade area households in the overlapping geographies may redirect their purchasing to the Candlestick Point retail stores, the representative centers and surrounding regional retail could experience potential sales impacts of as much as 16.1 percent of their 2009 retail base following the opening of the Candlestick Point retail area.

Projections show that long-term household growth would exceed the estimates of potential consumer sales base diversions for two of the three representative trade areas (Westfield and Tanforan). The trade area for the third representative regional center (Westlake) could experience a net loss of 1.1 percent of its 2009 estimated trade area household base despite household growth.[1336] Similar results are anticipated for the other regionally oriented shopping nodes. Consequently, local household growth from 2009 to 2030 in San Francisco and surrounding San Mateo County cities would likely be strong enough to generate sufficient new demand to offset most, if not all, potential sales impacts on competitive stores. Similarly, new household demand growth is anticipated to be ample enough to support the non-retail tenant space within the regional center and neighborhood retail component without creating substantial sales diversions from

[1336] This is based on a very conservative estimate that the planned Candlestick Point retail area would divert a full 50 percent of household demand from the overlapping trade area, and would be lower if a more moderate assumption of re-directed demand had been applied.

competitive businesses in the market area. If, however, a comparable business does close due to the opening of the new non-retail tenants at Candlestick Point, demand for other non-retail services or across retail categories is expected to be sufficient such that any vacant spaces can be re-tenanted.

San Francisco and northern San Mateo County offer a diverse set of retail options, which serve local residents, daily commuters, out-of-town business travelers, and tourists. Despite recent declines in local retail sales, most of the regional- and neighborhood-shopping areas that CBRE Consulting visited had limited vacancies due to store closures, and with the exception of the South Bayshore area, retail properties were typically well maintained. In addition, the San Francisco metro area is viewed as a vibrant market, where many national retailers are continuing to expand. Based on the findings regarding the presence of new retail demand sufficient to support the Candlestick Point regional and neighborhood retail components, other cumulative retail projects, and/or backfill retail spaces vacated as a result of Project impacts, the Candlestick Point regional and neighborhood retail components would not cause or contribute to urban decay. This conclusion pertains to the Candlestick Point retail components on both an individual and cumulative basis.

HPS Phase II Retail Sales Impacts

The HPS Phase II neighborhood retail would be located in a Village Center and along adjacent streets, totaling 125,000 square feet. The largest component, a small grocery store, would account for 30 percent of the space. General merchandise retailers, restaurants, and specialty retail are anticipated to account for 15 percent of the space each. Other retailers and business and personal services stores are each projected to account for 10 percent. About 5 percent of the space would be filled by home furnishings and appliances stores.

Sales at the HPS Phase II neighborhood retail component would total $41.3 million annually. Sales at the HPS Phase II neighborhood retail component would be concentrated in a Grocery Store, the Other Retail Stores category, Restaurants, and the General Merchandise category as those categories are defined in the CBRE Consulting analysis in Appendix U.

HPS Phase II market area household growth represents a major source of new demand for the planned retail and other area retailers. A total of 13,892 new households will be added to the HPS Phase II market area between 2009 and 2030, which includes the 10,500 units planned for the Project and the 1,600 units planned at Schlage Lock. The market analysis assumes that HPS Phase II market area retailers can reasonably expect to capture between 20 and 90 percent of the new household demand, depending on the retail category. Capture rates were estimated based on consumer spending patterns as well as the amount of existing retail offerings in the market area as opposed to offerings outside the market area. Applying these capture rates (refer to Exhibit 30 to Appendix U), HPS Phase II market area retailers would capture up to $116.9 million in sales generated by the new market area residents. The analysis further concludes that $13.8 million in new household demand is likely to be captured by the planned HPS Phase II neighborhood retail stores. This comprises approximately 12 percent of all available market area captured sales, and $103.1 million in new household demand would be available to offset any sales diverted from existing retailers as a result of HPS Phase II achieving its projected level of sales.

Another source of potential retail demand for new retail projects can be recaptured sales leakage from resident spending that is occurring outside the HPS Phase II market area. Exhibit 31 of Appendix U shows

that there is leakage in the relevant categories of General Merchandise, Eating and Drinking Places, and Other Retail Stores. It is assumed that only one-third of leakage in the market area in the relevant categories would be absorbed by new retail offerings as HPS Phase II. Given this conservative assumption, it is estimated that there would be $5.4 million of retail sales leakage in General Merchandise, $1.9 million in Eating and Drinking Places, and $9.8 million in Other Retail Stores available to HPS Phase II retailers.

The demand associated with new household growth is expected to absorb a large component of sales at the planned HPS Phase II neighborhood retail area in 2030, which represents the first full year of operations. New demand associated with household growth is estimated to account for $13.8 million of the Project's $41.3 million in market area sales (Market Area Sales Captured x Estimated Capture of Demand from New Households). The remaining $103.1 million in demand from new households (Market Area Sales Captured minus Estimated Capture of Demand from New Households – See Exhibit 30 of Appendix U) would be distributed among other market area stores, such that any potential impacts to existing stores would be fully offset. While these recaptured sales would occur to the detriment of other retailers outside the market area, there is still other remaining demand available to offset both these impacts and those in the market area. Therefore, no substantial impacts would occur to the detriment of existing retailers due to the proposed HPS Phase II neighborhood retail.

With respect to an analysis of sales impacts beyond the HPS Phase II market area, CBRE Consulting identified and analyzed neighborhood-oriented shopping nodes within San Francisco and in cities to the south. The analysis of neighborhood retail impacts utilizes the locations of mid-sized to larger Food Stores as an indicator of the distribution of local shopping areas near the HPS Phase II market area. Exhibit 36 of Appendix U presents a map of forty-four grocery stores located in San Francisco, Daly City, and South San Francisco. Three of these stores are within the HPS Phase II neighborhood market area. The remaining forty-one stores are viewed as potentially competitive with the Food Stores component of the proposed HPS Phase II retail development. Supermarkets and neighborhood retail centers typically draw customers from a 3- to 5-mile trade area. Seven of the forty-one stores were selected for detailed analysis, all within a 3-mile radius trade area:

- Whole Foods Market (399 4th Street, San Francisco)
- Foods Co. (1800 Folsom Street, San Francisco)
- Good Life Grocery (1524 20th Street, San Francisco)
- Delano IGA Market (1245 South Van Ness Avenue, San Francisco)
- Safeway (5290 Diamond Heights Boulevard, San Francisco)
- Safeway (4950 Mission Street, San Francisco)
- Safeway (30 Chestnut Avenue, South San Francisco)

Trade area household estimates range from 50,648 households for the Safeway in South San Francisco to 247,754 household for the Foods Co. supermarket on Folsom Street. As many as half of the households located within the overlap of a store's trade area and the HPS Phase II retail market area may shift their related purchases to the neighborhood retail component of the Project. For one of the stores, up to an estimated 7.7 percent of its 2009 trade area demand (equivalent to 9,861 households) and 7.7 percent of other neighborhood sales near this store may be diverted to the HPS Phase II neighborhood retail stores. For the other stores, the consumer base diversion would range from 0.8 percent to 4.9 percent, assuming a very conservative 50 percent shift in existing overlapping household demand. Based on household

growth projections for the market area, each of the representative store trade areas would be likely to experience sufficient levels of new demand to offset any projected sales diversions prior to 2030. None of the seven representative grocery stores or their surrounding local shopping nodes would experience a net loss in demand due to the opening of the planned HPS Phase II neighborhood retail component. In general, the level of trade area overlap, even for the most proximate grocery stores or neighborhoods, would not be substantial compared to the levels of household growth projected from 2009 to 2030.[1337]

Moreover, as shown in Exhibit 8 and Table 4 of Appendix U, about 10 percent of the tenant space (11,875 square feet) in the HPS Phase II neighborhood retail area is allocated to non-retail services businesses such as a bank branch or a dry cleaner. Since new household growth is estimated to create demand that is sufficient to offset potential retail sales impacts, it is likely that this incremental demand would also support the anticipated mix of neighborhood-oriented non-retail tenants without generating sales diversions from comparable businesses.

San Francisco and northern San Mateo County offer a diverse set of retail options, which serve local residents, daily commuters, out-of-town business travelers, and tourists. Despite recent declines in local retail sales, most of the regional- and neighborhood-shopping areas that CBRE Consulting visited had limited vacancies due to store closures, and with the exception of the South Bayshore area, retail properties were typically well maintained. In addition, the San Francisco metro area is viewed as a vibrant market, where many national retailers are continuing to expand. Based on the findings regarding the presence of new retail demand sufficient to support the HPS Phase II neighborhood retail, other cumulative retail projects, and/or backfill retail spaces vacated as a result of Project impacts, the HPS Phase II retail component would not cause or contribute to urban decay. This conclusion pertains to the HPS Phase II retail component on both an individual and cumulative basis.

Cumulative Impacts

This analysis quantifies the impact of the Project retail taking into consideration other planned competitive retail developments. The cumulative projects are those that are reasonably foreseeable to be open and have a first full year of retail operations by 2030. The approach for this analysis is the same as for the Project analysis: if the cumulative retail developments, including the planned Project retail, add sales to a retail category in an amount greater than the combination of estimated recaptured leakage in the category and the expected demand from new households, the remaining sales are estimated to be diverted from existing market area retailers. The cumulative projects and assumptions made in their selection are identified in Appendix U and Exhibits 44 and 46. Several cumulative projects are identified related to the Candlestick Point development, and one project, India Basin, is identified as a cumulative project with respect to the HPS Phase II component.

Based on the methodology in Appendix U and calculations shown in Exhibit 49, cumulative projects within and near the Candlestick Point market area would capture 7.6 percent of new household demand and contribute $263.8 million in estimated retail sales to the Candlestick Point market area by 2030.[1338] The

[1337] CBRE Consulting, September 2009.
[1338] Approximately $206.6 million in sales would be generated by projects in the Candlestick Point market area and $71.1 million would come from projects outside of but near the Candlestick Point market area. Refer to Exhibit 49.

estimated new household demand for retail estimated to be captured by the Candlestick Point regional center/neighborhood retail area in combination with the cumulative projects totals $35.5 million. The remaining new household demand, $389.2 million, is then reduced by the estimated HPS Phase II neighborhood retail sales, since the previous analysis found that all HPS Phase II sales would be offset by new household demand. The net remaining demand that would offset impacts to other existing retailers is $347.9 million (refer to Exhibit 55 of Appendix U). The Candlestick Point market area may experience up to $125.3 million in sales impacts in 2009 dollars that will likely be spread among many retailers. However, if certain retailers are affected disproportionately, store closures could occur. The final remaining new household demand in the Candlestick Point market area ($180.2 million) is in categories that could be re-tenanted by a retailer in a category with remaining new household demand. Therefore, any vacancies due to the Candlestick Point component and the cumulative projects would not remain empty for a prolonged period of time. The existing retail districts in the Candlestick Point market area, Leland Avenue, San Bruno Avenue, Third Street, and South Bayshore, also are unlikely to be negatively impacted by the Candlestick Point regional center and neighborhood retail area in combination with cumulative projects because their main retail categories are estimated to have minimal impacts. New household growth in the Candlestick Point market area and remaining demand in categories such as Restaurants, Food Stores, and Building Materials categories would be likely to benefit the existing retail districts.[1339]

Cumulative projects in the HPS Phase II market area would capture 9.1 percent of new household demand and contribute $12.7 million in retail sales to this market area. Approximately $14.8 million of new household demand for retail would be captured by the HPS Phase II neighborhood retail area in combination with the India Basin cumulative project. The remaining new household demand would be $102.1 million. The HPS Phase II market area may experience up to $0.4 million in sales impacts in 2009 dollars in the Other Retail Stores category. These impacts would be relatively small, accounting for only 1.0 percent of the market area sales base in this retail category, or 0.1 percent overall. These impacts would likely be spread among many retailers; however, if certain retailers are affected disproportionately, store closures could occur. If store closures were to occur, vacant spaces could be re-tenanted by a retailer in a category with remaining new household demand. Therefore, existing retail in the HPS Phase II market area would not be negatively impacted by the neighborhood retail planned at HPS Phase II and India Basin. Instead, new household growth in the HPS Phase II market area would likely benefit the existing retail uses.[1340]

Conclusion

As noted, above, new household demand by 2030, the assumed operational year of the Project retail developments, is anticipated to be sufficient to result in minimal anticipated negative sales impacts on existing retailers. There would be new demand due to household growth to support the Project's retail projects and recapture leakage relative to HPS Phase II, as well as existing retail developments both in the retail market areas and nearby (with shared market portions) that may experience some Project-related diverted sales. The planned Project retail components would not lead to the closure of existing retailers on a cumulative basis after consideration of demand generated by household growth. Despite identified plans

[1339] CBRE Consulting, September 2009.
[1340] CBRE Consulting, September 2009.

for 3.5 million square feet of cumulative retail development, the Project's retail components would not result in retail store impacts leading to prolonged retail store vacancy. While some stores could close as a result of diverted retail sales, sufficient retail demand is anticipated in other retail categories that would enable new or expanded retail establishments to "backfill" the resulting vacancies. Therefore, the existing retail commercial base is not anticipated to experience prolonged vacancy or other conditions likely to contribute to or lead to urban decay. The Project's impact on an individual and cumulative basis would be less than significant.

CHAPTER VI **Alternatives**

VI.A INTRODUCTION

VI.A.1 Legislative Framework

In accordance with CEQA Guidelines Section 15126.6, EIRs are required to include a discussion of alternatives to a proposed project. Section 15126.6(a) states that an EIR should describe a range of reasonable alternatives to a project that would attain most of the basic objectives of a project while reducing one or more of the significant impacts of the project, and should evaluate the comparative merits of those alternatives.

Public Resources Code Section 21002 states, in pertinent part:

> In determining the nature and scope of alternatives to be examined in an EIR, the Legislature has decreed that local agencies shall be guided by the doctrine of "feasibility." It is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. In the event specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof.

California has declared that the statutory requirements for consideration of alternatives must be judged against a rule of reason. CEQA Guidelines Section 15126.6(f) defines the "Rule of Reason," which requires that an EIR set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to those that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only those that the lead agency determines could feasibly attain most of the basic objectives of the project. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR is *(i)* failure to meet most of the basic project objectives, *(ii)* infeasibility, or *(iii)* inability to offer substantial environmental advantages over the project proposal (CEQA Guidelines Section 15126.6(c)).

CEQA Guidelines Section 15126.6(e)(1) requires an analysis of the No Project Alternative. The purpose of describing and analyzing the No Project Alternative is to allow decision-makers to compare the impacts of approving the Project with the impacts of not approving the Project. CEQA Guidelines Section 15126.6(e)(3)(A) provides that "when the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the 'no project' alternative will be the continuation of the existing plan, policy or operation into the future." The No Project Alternative in this chapter discusses future conditions on the Project site if current planning controls continued in the future and no other Redevelopment actions or incentives were implemented.

CEQA Guidelines Section 15126.6(f)(1) states that "the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent)."

VI.A.2 Analytic Method

This chapter describes the Project alternatives and identifies potential environmental impacts associated with implementation of Project alternatives relative to the impacts of the Project. The Project variants discussed in Chapter IV (Project Variants) could be approved instead of the Project. Therefore, the alternatives analysis also includes a comparison of impacts of Project alternatives relative to the impacts of the variants. To identify reasonable alternatives to this Project, the Agency and the City, as co-Lead Agencies, considered the objectives of the Project, those alternatives that are feasible to accomplish, and those alternatives that could reduce one or more of the significant impacts of the Project.

The general process for identifying alternatives for consideration in the document included these steps:

1. Review the significant effects resulting from the Project and identify possible strategies to avoid or lessen such impacts
2. Review ideas and alternative concepts suggested during the Project scoping process and any presented to the lead agencies during the preparation of the DEIR
3. Categorize and evaluate strategies and concepts for the ability to meet the basic project objectives and avoid or lessen significant impacts
4. Develop preliminary alternatives based on the strategies and concepts retained from preliminary screening and evaluate feasibility with respect to technical, institutional, costs and regulatory considerations
5. Select and refine a final set of alternatives for CEQA analysis

From this process, four alternatives, in addition to the required No Project Alternative, were selected for further evaluation and comparison to the Project and the Project Variants. Together, this set of five alternatives represents a broad range of options in terms of how key aspects of the proposed Project could be implemented. Each alternative differs from the Project in one or more of the following ways:

1. In the treatment of the Yosemite Slough bridge, either by changing the design or removing the Bridge proposal from the project and substituting an alternative transportation component
2. In the intensity of development
3. In the location and type of land uses
4. In the treatment of the Candlestick Point State Recreation Area (CPSRA), either by changing the reconfiguration proposed or removing the CPSRA from the project
5. In the treatment of the 49ers Stadium, either by changing the location of the Stadium or removing the Stadium from the project

The alternatives selected were judged the best to represent the range of identified strategies and concepts. Mitigation measures that have been identified for Project impacts would apply to impacts of the alternatives if the alternatives analysis indicates that mitigation is required to minimize a similar significant impact.

VI.A.3 Project Objectives

Project alternatives were evaluated for their ability to attain most of the basic objectives of the proposed Project, consistent with CEQA. Project objectives are identified in Chapter II (Project Description) and are summarized below.

- The integrated development should produce tangible community benefits for the Bayview and the City
- The integrated development should reconnect Candlestick Point and the HPS site with the larger Bayview neighborhood and should maintain the character of the Bayview for its existing residents
- The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and include the rebuilding of Alice Griffith Public Housing
- The integrated development should incorporate environmental sustainability concepts and practices
- The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure
- The integrated development should be fiscally prudent, with or without a new stadium

Project objectives are described in more detail in the Chapter II.

VI.B DESCRIPTION OF ALTERNATIVES TO THE PROJECT

Five alternatives to the Project have been evaluated, including the No Project Alternative, as required by CEQA, an alternative that presents the same development program as the Project, but without building a bridge over the Yosemite Slough, and three different reduced development alternatives. The alternatives considered include the following:

- **Alternative 1: No Project**—Consistent with Section 15126.6(e)(1) of the CEQA Guidelines, this alternative assumes that no new development would occur at Candlestick Point and HPS Phase II would be developed with new uses consistent with the existing *Hunters Point Shipyard Redevelopment Project* (HPS Redevelopment Plan).

  This alternative was selected in accordance with CEQA Guidelines Section 15126.6(e)(3)(A), which states that when the project is the revision of an existing land use or regulatory plan, policy, or ongoing operation, the "no project" alternative would be the continuation of the existing plan, policy, or operation into the future. This discussion would allow the decision-makers to compare the impacts of approving the Project with the impacts of not approving the Project.
- **Alternative 2: CP-HPS Phase II Development Plan; No Yosemite Slough Bridge**—Alternative 2 would have the same land use program proposed with the Project, including the State Parks agreement. Alternative 2 would not include the Yosemite Slough bridge. The main roadway connection between Candlestick Point and HPS Phase II would be via Ingalls Street. A bus rapid transit (BRT) route would be constructed along an abandoned railroad right-of-way to provide access between Candlestick Point and HPS Phase II. This alternative assumes that the 49ers Stadium is relocated to HPS Phase II and the Agency enters into an agreement with CPSRA to reconfigure CPSRA land in the same way as for the Project.

  This alternative was selected to avoid impacts to biological and scenic resources associated with bridge construction and operation, although these Project impacts were identified as less than significant. Significant traffic, noise, and air quality impacts would not be reduced. This alternative

would result in greater transportation-related impacts on game days because vehicular ingress and egress to and from the stadium would be delayed and traffic levels would be increased on local streets, including Innes Avenue, Evans Avenue, and Ingalls Street.

- **Alternative 3: Reduced CP-HPS Phase II Development; San Francisco 49ers Stay at Existing Candlestick Park Stadium; Limited State Parks Agreement; Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians**—Alternative 3 would be a reduced development alternative. Total housing with this alternative would be 5,210 units, about half of the units proposed with the Project. At Candlestick Point, residential development would be decreased and retail and arena uses would not be developed. Replacement of the Alice Griffith Public Housing site would occur and consist of 1,210 housing units. Minor improvements would be made to the CPSRA under the Limited State Parks Agreement. At HPS Phase II, housing would be increased; other uses at HPS Phase II would be similar to the Project. A new Yosemite Slough bridge serving only transit, bike, and pedestrian traffic would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. This alternative assumes that the 49ers football team would continue to use the existing Candlestick Park stadium. At HPS Phase II, the alternative would not include a new 49ers Stadium.

  This alternative was selected to provide an alternative to the Project that reduces construction-related impacts generally and operational impacts associated with traffic, air quality, noise, demand for public services, biological resources, and other growth-related impacts. The development program of this alternative would be reduced compared to the Project and would generate fewer vehicle trips and reduce the area subject to development. This alternative would reduce traffic and noise impacts associated with an increase in vehicle trips and air quality impacts associated with Project construction and operation. This alternative would reduce impacts to biological resources associated with bridge construction and operation as a result of the narrower bridge footprint and reduced bridge traffic. Construction and/or operational impacts related to the amount of development and the development footprint, such as soil erosion and stormwater runoff, as well as operational impacts related to population and employment growth, such as police and fire services, would also be reduced by this alternative.

- **Alternative 4: Reduced CP-HPS Phase II Development; Historic Preservation; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge**—Alternative 4 would also be a reduced development alternative. Total housing with this alternative would be 7,350 units, about 30 percent less than proposed with the Project. The proposed floor areas for most uses would be approximately 30 percent smaller at full build-out in comparison to build-out of the Project. This alternative includes preservation of five potentially historic structures at HPS Phase II.[1341] No Yosemite Slough bridge, stadium, or marina would be built. The State Parks agreement would occur.

  This alternative was selected to include historic preservation of the five eligible structures on HPS and to provide a reduced development alternative to the Project. This alternative would reduce the area subject to development and would avoid significant impacts to historic resources at HPS Phase II. Reduced development would result in fewer vehicle trips. This alternative would reduce traffic and noise impacts associated with the increase in vehicle trips and air quality impacts associated with Project operation and construction. This alternative would also avoid impacts to biological resources associated with bridge construction and operation. Construction and/or operational impacts related to the amount of development and the development footprint, such as soil erosion and stormwater runoff, as well as operational impacts related to population and employment growth, such as police and fire services, would also be reduced by this alternative.

[1341] Since publication of the Draft EIR, the Project has been revised to incorporate preservation of Building 208.

- > **Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation**—This subalternative to Alternative 4 retains all of the historic buildings, but includes the same land use plan as described for the Project rather than a reduced development plan as under Alternative 4. The Project's land use plan would be implemented under this alternative in terms of total square footage of land uses and district locations. However, unlike the Project, Buildings 211, 224, 231, and 253 would be retained. The R&D square footage that, under the Project, would be built at the location of Buildings 211, 224, 231, and 253 would be distributed throughout other areas of the HPS Phase II development. Consequently, under this subalternative, the total floor area for R&D would remain the same as the Project, at 2,500,000 sf. However, the building heights in the R&D District on HPS Phase II would increase to accommodate the displaced square footage. Buildings 211, 231, and 253 would be rehabilitated under the Secretary of Interior's Standards to accommodate approximately 338,000 gsf of R&D and 1,000 parking spaces. Building 224, the air raid shelter, would be rehabilitated to provide museum space.
- Subalternative 4A would also retain existing grades, allowing railroad spurs and other historic elements to remain. A wave protection berm is proposed to accommodate a 36-inch sea level rise. The Bay Trail would run on top of the berm, which would be designed to include seat steps. All other components of Subalternative 4A would remain the same as under the Project.

- **Alternative 5: Reduced CP-HPS Phase II Development; No HPS Phase II Stadium, State Parks Agreement, or Yosemite Slough Bridge**—Alternative 5 would have the same land use program proposed with the Project, except that the new stadium at HPS Phase II and the Yosemite Slough bridge would not be constructed and the 49ers would continue to utilize Candlestick Park. The total number of housing units would be the same as for the Project; however, because this alternative would not include the CPSRA boundary reconfiguration, the land area available for development would be smaller. Approximately 1,350 units would be shifted from Candlestick Point to HPS Phase II. This alternative assumes a State Parks agreement does not occur and there is no agreement with the 49ers for a stadium at the Project site.

  This alternative was selected to reduce construction impacts generally and to avoid impacts to biological resources associated with bridge construction and operation. Significant traffic, noise, and air quality impacts would not be reduced. Construction impacts that relate to the size of the development footprint would also be reduced by this alternative.

Alternatives 2 through 5 are depicted in Figure VI-1 (Alternative 2 Circulation Plan Railroad Right-of-Way for Bus Rapid Transit), Figure VI-2 (Alternative 3 Land Use Plan), Figure VI-3 (Alternative 4 Land Use Plan), and Figure VI-4 (Alternative 5 Land Use Plan).

Consistent with the analysis of Project impacts, the primary focus of this alternatives analysis is the physical development that could occur, rather than the policy framework required of or by that development. The alternatives identified above consider a range of different types, sizes, or locations of physical development and the physical properties of these alternatives (including the amount and location of such development and the employment and housing provided by this development) that could result in physical effects to the environment. The analysis of potential impacts assumes that each alternative would comply with applicable Project requirements and implement all feasible mitigation measures. Only those impacts that were identified as less than significant or significant and unavoidable for the Project are compared to alternatives impacts in this analysis, except where the alternative would have an impact but the Project analysis identified no impact. Further, for purposes of comparison, where significant and unavoidable impacts were identified for the Project, the impact for the same threshold for each of the alternatives is identified by

both significance level and whether the impact is greater than, similar to, or less than the impact of the Project, even if the level of significance does not change.

VI.C ANALYSIS OF PROJECT ALTERNATIVES

This section provides an analysis of the environmental impacts of each of the alternatives, including a comparison of the potential impacts of the alternative to the Project's less-than-significant and significant and unavoidable impacts, as well as the impacts that would result from implementation of the Project alternatives themselves. For each alternative, it is assumed that relevant Project requirements and/or mitigation measures identified for the Project would be implemented, if required to reduce the impacts for the alternative. Table VI-1 (Summary of Project Alternatives) presents a summary of the alternatives compared to the Project.

Table VI-1 Summary of Project Alternatives

Use	*Project*	*Alternative 1 No Project*[a]	*Alternative 2 No Bridge Alt*	*Alternative 3 49ers at Candlestick*	*Alternative 4 Lesser Build*	*Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation*	*Alternative 5 No Park Agreement*
Candlestick Point							
Residential (units)	7,850	0	7,850	1,210	5,495	7,850	6,500
Retail (gsf):							
Regional Retail	635,000	0	635,000	0	444,500	635,000	635,000
Neighborhood Retail	125,000	0	125,000	0	87,500	125,000	125,000
Retail Subtotal (gsf)	*760,000*	*0*	*760,000*	*0*	*532,000*	760,000	*760,000*
Community Services (gsf)	50,000	0	50,000	0	50,000	50,000	50,000
Hotel (gsf)[a]	150,000	0	150,000	0	105,000	150,000	150,000
Office (gsf)	150,000	0	150,000	0	105,000	150,000	150,000
10,000-seat Arena (gsf)	75,000	0	75,000	0	75,000	75,000	75,000
Football Stadium (seats)	0	70,000	0	70,000	0	0	70,000
HPS Phase II							
Residential (units)	2,650	1,800[b]	2,650	4,000	1,855	2,650	4,000
Neighborhood Retail (gsf)	125,000	570,000	125,000	125,000	87,500	125,000	125,000
Research & Development (gsf)	2,500,000	1,087,000	2,500,000	2,500,000	1,750,000	2,500,000	2,500,000
Artists' Studios (gsf):							
1:1 Studio Renovation and Replacement (gsf)[c]	225,000	225,000	225,000	225,000	225,000	225,000	225,000

Table VI-1 Summary of Project Alternatives

Use	*Project*	*Alternative 1 No Project*[a]	*Alternative 2 No Bridge Alt*	*Alternative 3 49ers at Candlestick*	*Alternative 4 Lesser Build*	*Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation*	*Alternative 5 No Park Agreement*
New Artist Center (gsf)	30,000	0	30,000	30,000	30,000	30,000	30,000
Artist Studio Subtotal (gsf)	*255,000*	*225,000*	*255,000*	*255,000*	*255,000*	255,000	*255,000*
Community Services (gsf)	50,000	0	50,000	50,000	50,000	50,000	50,000
Football Stadium (seats)	69,000	0	69,000	0	0	69,000	0
Mixed-Use	0	580,000	0	0	0	0	0
Cultural and Education	0	330,600	0	0	0	0	0
Marina (slips)	300	0	300	300	0	300	300
Other Elements							
Yosemite Slough bridge	Bridge	No bridge	No bridge	BRT/Pedestrian bridge	No bridge	Bridge	No bridge
Shoreline Improvements	Yes	No	Yes	Yes	Yes	Yes	Yes
State Parks Agreement/total acres of State Parkland	Yes/96.7	No/120.2	Yes/96.7	Yes/117.2[d]	Yes/96.7	Yes/96.7	No/120.2

SOURCE: Lennar Urban, PBS&J, 2009.

a. Hotel uses include 220 rooms at the proposed Regional Retail Center.
b. 1,800 housing units on the entire Shipyard including the Phase I site.
c. Existing artist studios would be replaced at a one-to-one ratio under all alternatives.
d. Limited exchange of 3.03 acres to construct BRT/pedestrian only Yosemite Slough bridge and Alice Griffith Public Housing

VI.C.1 Alternative 1: No Project

Summarized Description

Alternative 1 assumes that the build-out allowed under Proposition G, the voter-approved initiative that enabled the Project, would not be pursued. Development regulations and zoning would revert to the regulations that were in place prior to passage of Propositions D and F and establishment of the Candlestick Point Special Use District.[1342] The Yosemite Slough bridge would not be constructed, and the circulation network would not be altered. No new uses would be constructed at Candlestick Point. Development at HPS Phase II would proceed under land use plans and controls adopted as part of the HPS Redevelopment Plan, described in detail below and shown in Table III.B-5. Table VI-2 (Comparison of Alternative 1 and Project Build-Out) provides a comparison of the uses proposed in the Project site under the Project and Alternative 1.

[1342] Note that the Candlestick Point Special Use District was repealed by passage of Proposition G in June 2008.

Table VI-2 Comparison of Alternative 1 and Project Build-Out

Use	*Alternative 1*	*Project*	*Comparison to Project*
Candlestick Point			
Residential (units)	0	7,850	-7,850
Retail (gsf):			
Regional Retail	0	635,000	-635,000
Neighborhood Retail	0	125,000	-125,000
Community Services	0	50,000	-50,000
Hotel (gsf)	0	150,000	-150,000
Office (gsf)	0	150,000	-150,000
10,000-seat Arena (gsf)	0	75,000	-75,000
Football Stadium (seats)	70,000	0	70,000
HPS Phase II			
Residential (units)	1,800[a]	2,650	-850
Neighborhood Retail (gsf)	570,000	125,000	+445,000
Research & Development (gsf)	1,087,000	2,500,000	-1,413,000
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	0	30,000	-30,000
Community Services	0	50,000	-50,000
Football Stadium (seats)	0	69,000	-69,000
Mixed Use	580,000	0	580,000
Cultural and Education	330,600	0	330,600
Other Elements			
Yosemite Slough bridge	No	Yes	-
Marina	No	Yes	-
State Park Agreement/total acres of State Parkland	No/120.2	Yes/96.7	+23.5

SOURCE: Lennar Urban, PBS&J, 2009.
a. 1,800 housing units on the entire Shipyard including the Phase I site.

Detailed Description

Candlestick Point

Under Alternative 1, no new development would occur at Candlestick Point. The Alice Griffith Public Housing complex would not be replaced, and the Candlestick Park stadium would continue to function as under existing conditions. The CPSRA land agreement between the Candlestick Point and HPS Phase II sites would not be pursued. No new open space would be developed at this site and no improvements of the existing open space would occur.

HPS Phase II

Alternative 1 assumes that HPS Phase II would be developed with new uses consistent with the existing HPS Redevelopment Plan. Under these land use controls, this alternative would result in construction of up to 1,800 new housing units (on the entire Shipyard, including the Phase I site), approximately 570,000 gross square feet (gsf) of neighborhood commercial space, 1,087,000 gsf of R&D space, and one-to-one replacement of existing artist studios. This alternative would also include 580,000 gsf of mixed-use development and 330,600 gsf of cultural and educational space, uses not proposed under the Project. The HPS Redevelopment Plan also allows maritime industrial uses. The San Francisco 49ers football stadium would not be relocated to HPS Phase II, and the community services and artist center proposed under the Project would not be constructed at this site.

Basis for Impact Analysis

For the Project, the potential impacts are generally based on the parameters of the Project, which include the size, bulk, and type of development, the footprint of development, and the number of residents, employees, and visitors to the Project site. For Alternative 1, the impacts of the Project are compared to the impacts that would occur with new development at HPS Phase II consistent with the existing HPS Redevelopment Plan and Hunters Point Shipyard Design for Development (Hunters Point Shipyard D4D).[1343,1344] Furthermore, development under Alternative 1 at HPS Phase II would be subject to the mitigation measures adopted with certification of the *Final Environmental Impact Statement* (EIS) *for Disposal and Reuse of Hunters Point Shipyard* (Hunters Point Shipyard Final EIR).[1345] Development at HPS Phase II under Alternative 1 would also be subject to the requirements of the City's *Municipal Code*. Under Alternative 1, no development would occur at Candlestick Point and the existing uses and site conditions would remain as they are currently. The Yosemite Slough bridge and San Francisco 49ers stadium would not be constructed under any future development scenarios considered for Alternative 1.

Potential Impacts

Land Use and Plans

Implementation of Alternative 1 would not require amendments to the HPS Redevelopment Plan or other planning and policy documents. Development would be subject to the mitigation measures adopted for the Hunters Point Shipyard Redevelopment Plan. Development under Alternative 1 would not conflict

[1343] San Francisco Redevelopment Agency, *Redevelopment Plan for the Hunters Point Shipyard Redevelopment Project*, July 14, 1997. A copy of this document is available for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[1344] San Francisco Redevelopment Agency and San Francisco Planning Department, *Design for Development, Hunters Point Shipyard Redevelopment Project*, December 9, 2004. A copy of this document is available for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.
[1345] Navy, *Final Environmental Impact Statement for Disposal and Reuse of Hunters Point Shipyard*, November 20, 2000. A copy of this document is available for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the City Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103 as part of File No. 2007.0946E.

with applicable land use plans, policies, or regulations (of an agency with jurisdiction) adopted for the purpose of avoiding or mitigating an environmental effect and this impact would be less than significant, the same as for the Project.

Implementation of Alternative 1 would not result in a substantial adverse change in the existing land use character. Development under Alternative 1 could change the character of the HPS Phase II site from industrial uses to mixed-use, industrial, R&D, cultural/educational, and open space uses in accordance with the HPS Redevelopment Plan. However, the range of uses at HPS Phase II would not result in a substantial adverse change in the existing land use character of the Project site. Therefore, similar to the Project, this impact would be less than significant. However, without development at Candlestick Point, the deteriorated conditions throughout much of the site would remain and the beneficial effects of the Project on improving the character of the site would not occur. Therefore, while the overall changes resulting from development under Alternative 1 would not be considered adverse, the limited changes would not allow for the overall benefits of the Project.

Population, Housing, and Employment

Construction activities associated with implementation of Alternative 1 would induce direct job growth at HPS Phase II. The number of construction workers that would be employed during the construction period would be less than the Project because construction at Candlestick Point would not occur, and the Yosemite Slough bridge and the San Francisco 49ers stadium would not be constructed. It is anticipated that construction employees would commute from elsewhere in the region, rather than relocate to the Bayview Hunters Point neighborhood for a temporary construction assignment. Thus, construction under this Alternative would not generate a substantial, unplanned population increase. Similar to the Project, direct and indirect impacts associated with construction employment would be less than significant; however, impacts would be even less than under the Project.

Implementation of Alternative 1 would induce direct and indirect population growth, but this growth would not be considered substantial. Development under this Alternative would not result in new housing at Candlestick Point, but would result in up to 1,800 units at the Shipyard (including Phase I). Employment growth generated by this Alternative would result in the demand for 6,773 new housing units, less than the total number of new housing units that would be provided. There would be over three times as many jobs provided as housing units (approximately 6,200 jobs compared to 1,800 housing units), which could result in indirect residential growth in the surrounding Bayview Hunters Point neighborhood. Although the residential units currently under construction at HPS Phase I would supplement this demand, the demand would still not be met. Therefore, the deficit in housing would result in a significant and unavoidable impact that does not occur with the Project.

Transportation and Circulation

Alternative 1 transportation effects would be those presented for the 2030 No Project conditions presented in Section III.D (Transportation and Circulation); development consistent with the 1997 HPS Redevelopment Plan and other growth would be projected to occur by 2030.

The Transportation Study analyzed Alternative 1 and conclusions from the Transportation Study are presented below.

Construction Impacts

- Construction activities associated with Alternative 1 would be reduced compared to the Project, depending on the phasing of the development. Localized construction-related traffic impacts would be less than significant under Alternative 1.

Intersection Conditions

Alternative 1, 2030 No Project conditions would have cumulative effects at 38 study intersections. With Alternative 1, 39 of the 60 study intersections would operate at LOS E or LOS F conditions during the weekday AM or PM, and Sunday PM peak hours, compared to three intersections under existing conditions, and 44 intersections with the Project. In addition, 2030 No Project Conditions would not include transportation improvements proposed as part of the Project. Section III.D discusses traffic effects at study intersections, and the feasibility of mitigation measures. In general, intersection conditions would be significant and unavoidable effects of the No Project Alternative.

Freeway Conditions

Alternative 1 freeway mainline sections effects, freeway ramp junction conditions, and ramp queuing effects would be similar to the Project conditions, with significant and unavoidable impacts.

Transit Impacts

Alternative 1 transit conditions assume implementation of the proposed SFMTA Transit Effectiveness Program (TEP), but no other Project-related transit improvements. Alternative 1 would have a less than significant impact on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with 2030 No Project would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. As concluded in Section III.D, the transit delay effects would remain significant and unavoidable. During the AM and PM peak hour, Alternative 1 would require 16 additional vehicles on the same routes as the Project, compared to up to 28 vehicles with the Project.

Parking Impacts

Alternative 1, assuming buildout of the 1997 HPS Redevelopment Plan, would result in a demand for about 9,150 spaces, compared with a maximum permitted supply of about 6,730 spaces; therefore, the maximum off-street parking supply would be about 2,420 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area,

shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Alternative 1 impacts on parking would be less than significant.

This alternative would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

The development program for HPS Phase II under the existing HPS Redevelopment Plan is substantially less than the development program for HPS Phase II under the Project. Therefore, construction-related impacts to scenic vistas, visual character or quality, and light and glare would be reduced compared to the Project, as the overall construction period and intensity at the HPS Phase II site would be reduced. In addition, all construction-related impacts at Candlestick Point would be avoided because construction would not occur on that portion of the site. Similar to the Project, all construction lighting at the HPS Phase II site would be required to comply with City of San Francisco lighting requirements. Therefore, similar to the Project, this impact would be less than significant; however, impacts would be more limited than under the Project.

Development at the HPS Phase II site under Alternative 1 would be subject to the Hunters Point Shipyard D4D, which establishes development guidelines for uses, bulk and mass, architecture, street design, signage, and parking. The Hunters Point Shipyard D4D limits all development at HPS Phase II to a maximum height of 65 feet, substantially less than the stadium and residential towers up to 370 feet proposed under the Project. There are no scenic resources on the HPS Phase II site that would be adversely affected by implementation of Alternative 1, similar to the Project. Thus, while the Project would not substantially obstruct views across the site or result in a substantial adverse effect on any scenic vistas, Alternative 1, since it would involve lower building heights and less development, would reduce this impact further. Similar to the Project, Alternative 1 would not substantially degrade the visual character or quality of the site, because development would comply with the Hunters Point Shipyard D4, as noted. Compliance with City requirements and the Hunters Point Shipyard D4D would ensure that impacts to scenic resources, visual character or quality, and light and glare would be less than significant, and less than under the Project.

Shadows

Since development under Alternative 1 would only occur at the HPS Phase II site, no new shading would occur at Candlestick Point. New shadows from development at HPS Phase II would be substantially reduced compared to the Project, because building heights would be limited to 65 feet and the overall development program would be reduced. Development under Alternative 1 would be subject to *Planning Code* Section 295, which only applies to new structures over 40 feet in height that would add shade to San Francisco Recreation and Parks Department (SFRPD) property between one hour after sunrise to one hour before sunset at any time of year. The only existing SFRPD properties in the vicinity of the HPS Phase II site are the India Basin Shoreline Park and India Basin Open Space. These areas are to the north of the HPS Phase II site, and the nearest development under Alternative 1 would have maximum heights of 55 to 65 feet. New shade created by implementation of Alternative 1 would occur at limited times of the day and year, and would not substantially affect the use of open space facilities at HPS Phase II. Similar to the Project, this impact would be less than significant; however, impacts would be even less than under the Project.

Wind

Development at HPS Phase II under Alternative 1 would not include structures above 65 feet in height. These structures would not extend far above surrounding existing buildings. Wind hazards would not be created at Candlestick Point because development would not occur at this site under Alternative 1. The Hunters Point Shipyard D4D would ensure pedestrian safety in pedestrian-access areas at HPS Phase II. Similar to the Project, wind impacts would be less than significant; however, impacts would be even less than under the Project.

Air Quality

Alternative 1 does not involve any development at Candlestick Point, and considerably less development would occur at HPS Phase II. No new stadium would be constructed, and the State Parks agreement would not occur. As development would be considerably less than under the Project, the potential air quality impacts would be less than the Project.

Construction activities for Alternative 1 would generate dust; however, they would need to comply with the *San Francisco Health Code* and BAAQMD requirements. A mitigation measure was adopted with certification of the Hunters Point Shipyard Final EIR that would require the Applicant to ensure that construction contractors comply with the dust control strategies included in an approved site-specific dust control plan, which would reduce the impacts caused by construction dust to a less-than-significant level.

Construction activities could also create diesel particulate emissions (DPM); however, as the development of Alternative 1 would be considerably smaller than the Project, this impact would likely remain less than significant. Construction activities could also generate toxic air contaminants (TAC) containing PM_{10}; however, as there would be fewer construction activities for Alternative 1, this impact would be less than significant.

Though operational emissions associated with Alternative 1 would be much lower than with the Project, due to the scale of Alternative 1, the mass emissions would exceed the BAAQMD CEQA thresholds. Therefore this impact would remain significant and unavoidable, similar to the Project. Alternative 1 has reduced R&D square footage and potential TAC emissions from facilities in R&D areas would also be reduced. With the implementation of a mitigation measure adopted with certification of the Hunters Point Shipyard Final EIR requiring evaluation of and permitting of all stationary sources of TACs, this impact would be less than significant, and less than the Project.

Additionally, as the scale of Alternative 1 would be smaller than the Project, the impacts from Alternative 1 traffic (e.g., carbon monoxide and $PM_{2.5}$) would be less than significant and less than the Project.

According to the current BAAQMD CEQA Guidelines, odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that the BAAQMD regards as having the potential to generate considerable odors include: wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, oil refineries and chemical plants. Alternative 1 would be a large mixed-use development containing residential, office, retail, R&D, recreational, and entertainment uses. Although there may be some potential for small-scale, localized odor issues to emerge around proposed sources such as solid waste collection, food preparation, etc., substantial odor sources and consequent effects on on-site

and off-site sensitive receptors would be unlikely and would be resolved by interventions after receipt of any complaints. This would be a less-than-significant impact. No mitigation is required.

The Project is consistent with regional air quality plans; therefore, as Alternative 1 would be smaller than the Project, it would remain consistent with these plans. Alternative 1 promotes the use of alternative transportation modes, such as transit, biking and walking. In addition, it puts housing in close proximity with jobs and retail establishments, reducing the length of trips and further reducing reliance on single-occupancy vehicles. Therefore, Alternative 1 conforms to the regional air quality plan and there would be a less-than-significant impact. No mitigation is required.

Noise

Under Alternative 1 no development would occur at Candlestick Point, and considerably less development would occur at HPS Phase II. No new stadium would be constructed, and the State Parks agreement would not occur. As development would be considerably less than under the Project, the potential noise impacts would be less than the Project.

Construction activities for Alternative 1 would expose sensitive receptors to increased noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which generally prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Compliance with Sections 2907 and 2908 of the *Municipal Code*, which require implementation of construction Best Management Practices to reduce construction noise and limit the hours of construction, would reduce any potentially significant impacts to less-than-significant levels, the same as for the Project.

Construction activities for Alternative 1 would result in a temporary or periodic increase in ambient noise that would be noticeable and likely cause for human annoyance. Construction activities would occur within 25 feet of existing and future residential uses. Pile driving activities could result in substantial noise levels of up to 107 dBA at new residential uses on the site or at adjacent existing residences. Construction-related temporary increases in ambient noise levels would be considered significant and unavoidable, the same as for the Project.

Construction activities could also create excessive groundborne vibration levels at proposed on-site residential uses, should the dwelling units be occupied before construction activity on adjacent parcels is complete. Compliance with Sections 2907 and 2908 of the Municipal Code would require implementation of construction Best Management Practices and limit the hours of construction. However, it is anticipated that construction activities would occur within 50 feet of vibration-sensitive receptors and, therefore, vibration levels would exceed the threshold for human annoyance (approximately 80 VdB). Compliance with Sections 2907 and 2908 of the *Municipal Code* would reduce vibration impacts under Alternative 1, but not to a less-than-significant level; therefore, this impact would remain significant and unavoidable, but less than the Project because fewer construction activities would be required.

Daily operation of Alternative 1, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities

associated with Alternative 1, such as truck deliveries, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of Alternative 1 would generate increased local traffic volumes that would cause a permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with Alternative 1 would be less than the Project due to less development, and significant impacts along Carroll Avenue, Gilman Avenue, and Jamestown Avenue would be eliminated, as no development would occur at Candlestick Point. This impact would be less than significant, and less than the Project.

Because Alternative 1 would not include a football stadium, the significant and unavoidable noise impacts identified for the Project from football games and concerts would not occur with implementation of Alternative 1.

Cultural Resources

Construction activities associated with Alternative 1 could result in a substantial adverse change in the significance of paleontological resources. Compared to the Project, these potential impacts would be limited to the HPS Phase II site only. Construction activities at HPS Phase II under the Project would be required to implement a mitigation measure (MM CP-3a) that would reduce potential impacts to paleontological resources through a *Paleontological Resources Monitoring and Mitigation Program*. Construction activities under Alternative 1 would be subject to the mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR. However, as no mitigation to reduce impacts to paleontological resources was adopted with certification of the Hunters Point Shipyard Final EIR, implementation of Alternative 1 could result in a substantial adverse change in the significance of paleontological resources, which would be a greater than the less-than-significant impact identified for the Project.

Construction activities associated with Alternative 1 could result in a substantial adverse change in the significance of archaeological resources. Unlike the Project, these potential impacts would be limited to the HPS Phase II site only. The HPS Phase II site is likely to contain subsurface archaeological resources from the Native American, Chinese fishing village, prehistoric, and maritime development periods. A mitigation measure was adopted with certification of the Hunters Point Shipyard Final EIR that would reduce potential impacts to archaeological resources through implementation of a treatment and monitoring program. Implementation of this measure would reduce the effects of Alternative 1 on archaeological resources to a less-than-significant level, which would be similar to the Project.

Implementation of Alternative 1 would retain Drydocks 2 and 3 and rehabilitate Buildings 140, 204, 205, and 207 at the HPS Phase II site. A mitigation measure was adopted with certification of the Hunters Point Shipyard Final EIR that would require that these resources be retained and any alterations that would affect the historic resources be implemented according to the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. However, development under Alternative 1 would result in the demolition of Buildings 211, 231, and 253, which have been identified in this EIR as historic resources in the potential expansion of the Hunters Point Commercial Dry Dock and Naval Shipyard Historic District to include Drydock 4 and contributing buildings. This would result in a significant impact, since the proposed actions would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility

for inclusion in the California Register of Historic Resources (CRHR). A mitigation measure to reduce impacts to these resources was not adopted with certification of the Hunters Point Shipyard Final EIR. Therefore, implementation of Alternative 1 would, like the Project, result in a substantial unavoidable adverse change in the significance of historic resources.

Hazards and Hazardous Materials

The potential hazardous materials impacts for development under Alternative 1 would only occur as a result of construction activities at the HPS Phase II site. Development under the existing HPS Redevelopment Plan would have a footprint comparable to the Project (for the HPS Phase II site) and would require similar construction activities. For development under Alternative 1, potential hazardous material impacts would be addressed through mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR. The mitigation measures address the following hazardous materials issue at the site: reuse prior to complete remediation; construction prior to remediation; reuse after complete remediation; construction after remediation; discovery of previously unknown contamination; ecological exposure; contamination of aquifers; and handling of naturally occurring asbestos. Similar to the Project, development under Alternative 1 would also be subject to the federal, state, and local requirements regulating the investigation and cleanup of hazardous materials contamination identified in Section III.K (Hazards and Hazardous Materials) of this EIR. Implementation of mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR, along with compliance with applicable regulations, would reduce potential hazardous materials impacts to less-than-significant levels.

Similar to the Project, after development under Alternative 1, land uses at the HPS Phase II site would involve the routine use, storage, transportation, and disposal of hazardous materials, but it would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Through compliance with the identified requirements (including adherence to applicable federal, state, and local regulations related to the use, storage and transport of such materials), no significant hazard to the public or the environment is anticipated to occur for development under Alternative 1. Similar to the Project, this impact would be less than significant.

Geology and Soils

Potential soil erosion impacts under development of Alternative 1 could occur as a result of construction activities at the HPS Phase II site only. Development under the existing HPS Redevelopment Plan would have a footprint comparable to the Project (for the HPS Phase II site) and would require similar construction activities. Similar to the Project, construction activities, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. The Hunters Point Shipyard Final EIR did not include mitigation measures to reduce soil erosion impacts. However, construction activities would be required to implement Best Management Practices (BMPs) through the City's permitting process. The BMPs would stabilize soils in construction areas and reduce soil erosion impacts.

The potential for exposure to adverse effects caused by seismic groundshaking and seismically induced ground failure such as liquefaction, lateral spreading, landslides and settlement exists at the Project site for development under Alternative 1. Development under Alternative 1 would incorporate appropriate

engineering practices to ensure seismic stability of all structures and improvements as required by state and local building code requirements. The potential for adverse effects caused by landslides, settlement, expansive and corrosive soils also exists. Compliance with the requirements of the *Building Code* would reduce all impacts to less than significant, similar to the Project.

Hydrology and Water Quality

The footprint and extent of development for Alternative 1 would be reduced compared to the Project, because no State Parks agreement would occur, the Yosemite Slough Bridge would not be constructed, and no new uses would be constructed at Candlestick Point. Development at HPS Phase II would be limited to land uses proposed and approved under the HPS Redevelopment Plan. As such, impacts from construction and operation of the Alternative 1 would be less than the Project.

With adherence to applicable regulatory requirements, construction activities associated with Alternative 1 would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. For development under Alternative 1, potential impacts associated with violation of water quality standards would be addressed through mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR. The mitigation measures address stormwater Best Management Practices (BMPs). Similar to the Project, development under Alternative 1 would also be subject to the federal, state, and local requirements regulating discharges to receiving water bodies identified in Section III.M (Hydrology and Water Quality) of this EIR. Implementation of mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR, along with compliance with applicable regulations, would reduce potential impacts to less-than-significant levels.

Construction activities associated with Alternative 1 would include excavation for building foundations and underground utilities, which could require short-term and/or long-term dewatering of the affected areas. As no extensive excavation is proposed for Alternative 1, the installation of underground building elements and utilities would not substantially alter groundwater levels, similar to the Project. As such, Alternative 1 would not substantially deplete groundwater supplies and would result in a less-than-significant impact, similar to the Project. As the total amount of open space under Alternative 1 is reduced compared to the Project, the amount of permeable surface within the Project area would also be less. Although the State Parks agreement would not occur, open space accounted for under the Project would remain. Therefore, Alternative 1 would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the Alternative 1 site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of Alternative 1, the existing drainage patterns within the area would generally be preserved. Construction activities associated with Alternative 1 would not substantially alter the existing drainage pattern of the site in ways that would result in substantial erosion, siltation, or flooding on or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated Alternative 1, including site clearance, grading, and excavation, could create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. The extent of the stormwater drainage system replacement proposed under Alternative 1 would not be extensive as under the Project; therefore, Alternative 1 would be expected to result in less extensive site disturbance. Potential impacts associated with violation of water quality standards would be addressed through mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR, requiring preparation of a SWPPP and implementation of stormwater BMPs, and would reduce this impact to a less-than-significant level, similar to the Project.

Operation of Alternative 1 could contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. New development would have the potential to degrade the quality of surface receiving waters through the introduction of new impervious surfaces that contribute to stormwater runoff volumes and from the mobilization of pollutants in stormwater that would be generated by the proposed land uses. The potential for degradation of water quality due to this development would be reduced to a less-than-significant level with the incorporation of mitigation from the Hunters Point Shipyard Final EIR, requiring preparation of a Stormwater and Erosion Control Plan. As the extent of impervious surfaces would be reduced compared to the Project, impacts would be less than the Project.

Alternative 1 would reduce wastewater flows into the Combined Sewer System compared to the Project. Stormwater and wastewater from the Candlestick Point site would continue to discharge into the Combined Sewer System, as no separated system would be constructed at Candlestick Point. Therefore, overall flows from the site during wet weather could increase, because it is unknown whether the reduction in stormwater from a separate system at HPS Phase II under Alternative 1 would completely offset the stormwater from Candlestick Point that would continue to enter the Combined Sewer System. If the volume of stormwater from Candlestick Point plus the additional wastewater generated by development at Hunters Point Shipyard exceeds the stormwater diverted from the HPS Phase II site after development (compared to existing conditions), this potential increase in wet-weather flows would increase the potential for discharge from the combined sewage outfalls, which could increase potential impacts to receiving waters, a greater impact than the less-than-significant impact identified for the Project. To reduce adverse effects to water quality in the Bay from the discharge of stormwater runoff and wastewater to the combined system, Alternative 1 would include implementation of mitigation measures from the Hunters Point Shipyard EIR. However, it is uncertain whether this mitigation would offset the existing stormwater flows from Candlestick Point such that there would be no net increase in wet-weather flows. Thus, potential impacts related to violations of water quality standards or waste discharge requirements could be significant with Alternative 1, and greater than the less-than-significant impact identified for the Project.

As discussed above, implementation of Alternative 1 would not substantially deplete groundwater supplies. Development under Alternative 1 would also not utilize groundwater as a source of water supply. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and this impact would be less than significant, similar to the Project.

Operation of Alternative 1 would not alter the course of a stream or river, as none exists at or near the site currently. Additionally, operation of Alternative 1 would not alter the existing drainage pattern of the site in ways that would result in substantial erosion, siltation, or flooding on or off site. Implementation of the Alternative 1 would not contribute runoff water that would exceed the capacity of existing or planned

storm sewer systems or provide substantial additional sources of polluted runoff as the existing stormwater system would accommodate runoff flows and treat runoff prior to discharge to the Bay. Implementation of mitigation measures from the Hunters Point Shipyard EIR, requiring design of stormwater improvements to control CSO volumes, would reduce all impacts to a less-than-significant level.

The Project site is located within a special flood hazard zone (Zone A), as mapped on the Preliminary Flood Insurance Rate Map (FIRM). Implementation of Alternative 1 would include the placement of housing and other structures within the proposed 100-year flood zone that could impede or redirect flows. Because the Hunters Point Shipyard EIR did not include mitigation addressing this issue, the flood-related impacts of Alternative 1 would be significant, especially considering projected future sea level rise. In comparison to the Project, which includes mitigation to reduce this impact to a less-than-significant level, the impact associated with Alternative 1 would be more severe and potentially significant.

The Project site is adjacent to, but not within, dam failure inundation zones. Thus, implementation of the Alternative 1 would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Furthermore, based on historical records and the location of development, the placement of residential development would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

Compared to the Project, implementation of Alternative 1 would result in fewer impacts to biological resources because no development would occur at Candlestick Point. Furthermore, impacts related to construction of the Yosemite Slough bridge, shoreline improvements, and marina would be avoided because no such improvements are included in the HPS Redevelopment Plan. Similar to the Project, development under Alternative 1 could result in increased strike hazards to the new buildings along the shoreline of HPS Phase II. However, the development intensity would be substantially less and would not include any structures greater than 65 feet in height. Therefore, adverse operational effects to migratory birds would be less than with the Project. Development under Alternative 1 would not conflict with any local policies or ordinances protecting biological resources, similar to the Project. Impacts would be less than significant.

Public Services

Police Protection

Construction activities associated with implementation of Alternative 1 could result in obstruction of emergency access. The Project includes mitigation that would require the preparation of a Construction Traffic Management Plan (CTMP) to reduce this impact. However, no mitigation was included in the Hunters Point Shipyard Final EIR to ensure maintenance of adequate emergency access at all times. The City permitting process would likely address construction staging and emergency site access during the construction period, but this is not assured. Without mitigation or a process to ensure emergency access at all times on the site, construction activities under Alternative 1 also could provide increased opportunity for criminal activity and increase demand for police services. This could be a potentially significant impact that would not occur under the Project.

Implementation of Alternative 1 would result in a smaller increase resident and employee population at the Project site because of the smaller amount of development compared to the Project. Alternative 1 would require an increase in police services (15 new officers) to provide a comparable level of service to existing conditions.[1346] The San Francisco Police Department (SFPD) evaluates the need for additional officers by sector, and not station or district needs. While it is unlikely that 15 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City could be warranted by development of Alternative 1. This impact would be less than significant, the same as for the Project, although somewhat less because of the smaller amount of development.

Under this Alternative, land would not be dedicated for community-serving uses. If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility would have to be constructed at an off-site location. Construction of a new SFPD facility (counter, storefront, or other configuration) within the community services uses on the Project site and/or the reconfiguration or expansion of the existing Bayview Station would be funded by either the SFPD or the Project Applicant.

The cost for additional police officers and on-going operational costs would be funded through property taxes collected from future owners of on-site properties. Development of this Alternative would not require new or physically altered police facilities beyond the scope of the Project to maintain acceptable police services. Therefore, for development under Alternative 1, this impact is considered less than significant, the same as for the Project.

Fire and Emergency Medical Services

No mitigation measure was included in the Hunters Point Shipyard Final EIR to ensure maintenance of continued emergency access during construction activities. Without mitigation to ensure adequacy of emergency site access during construction, there could be a new impact to fire protection and emergency medical services under Alternative 1 compared to the Project. While the City permitting process would likely address construction staging and emergency site access during the construction period, this is not assured, and, without mitigation or a process that would ensure emergency site access, this could result in a potentially significant impact that would not occur under the Project. Alternative 1 would include additional residential units and substantially increase employment-generating uses compared to existing conditions, resulting in an employment population of 6,200. The increase in the residential and daytime employment population (for a total population of 10,394, including a residential population of 4,194 (combined Phase I and Phase II) plus 6,200 employees), combined with an increase in the intensity of physical development on the Project site, would result in new demand for fire protection and emergency medical services, potentially resulting in the need to construct new facilities. This demand would be less than with the Project because of the lower amount of development under Alternative 1.

If needed, additional firefighters and ongoing fire protection operations would be funded through property taxes collected from future owners of on-site properties, allowing the San Francisco Fire Department (SFFD) to maintain acceptable response times for fire protection and emergency medical services. Under

[1346] The number of required police officers needed to meet comparable levels of service to existing conditions was determined using the total daytime population of Alternative 1 (residential population of 17,126 plus 7,578 employees) and the ratio of officers to population presented in Table II.O-2 (1:665 officer to population).

this alternative, land would not be dedicated for community-serving uses. Similar to the Project, prior to construction of new land uses at HPS Phase II, review of access strategies would be required pursuant to the SFFD's plan review requirements.[1347] However, because the stadium would not be constructed at HPS Phase II, consideration of game-day access would not be necessary. Compliance with all applicable provisions of the *San Francisco Fire Code*, in addition to the considerations discussed above, would ensure that this impact is less than significant for development under Alternative 1, the same as for the Project, although somewhat less because of the smaller amount of development.

Schools

Compared to the Project, the number of school-age children who would live within the Project site following full build-out of Alternative 1 would be substantially reduced. While schools in the Project vicinity have approximately 49 percent capacity remaining in the 2008-2009 school year, it is projected that a 12 percent overcapacity of San Francisco Unified School District (SFUSD) as a result of citywide population growth by 2030 would occur. Similar to the Project, the payment of school impact fees pursuant to SB50 would be considered full mitigation for potential school impacts. This impact is considered less than significant for development under Alternative 1, the same as for the Project.

Libraries

Construction of Alternative 1 would not result in impacts to the San Francisco Public Library (SFPL) system. Library branches are not currently located on the Project site. All library services would be available to the community throughout the duration of construction. As such, no impact to library services during construction of Alternative 1 would occur.

Residential and nonresidential development associated with Alternative 1 would increase demand for local library services in the Bayview neighborhood. Although this Alternative would result in a direct and indirect population increase within the Bayview neighborhood, library branches serving the Project site, including the Portola, Visitacion Valley, and the Bayview branches, would continue to meet the demands of the community. Unlike the Project, this alternative would not include space dedicated to library services to supplement the Bayview branch library. The SFPL branches would be required to accommodate increased demand from development under this Alternative. It is not anticipated that new or physically altered library facilities would be required in order to maintain acceptable service ratios; therefore, this impact is considered less than significant for development under Alternative 1. On balance, the impact would be substantially similar to the impact under the Project.

Recreation

Implementation of Alternative 1 would not include a State Parks land agreement or development of new parks at Candlestick Point. Compared to the Project, the CPSRA would remain 120.2 acres, compared to the 23.5-acre reduction under the Project. Neighborhood parks would be constructed at HPS Phase II consistent with the HPS Redevelopment Plan and Hunters Point Shipyard D4D. However, the amount of open space at HPS Phase II would be less than with the Project. Construction impacts associated with

[1347] San Francisco Fire Department, Plan Check website. http://www.sfgov.org/site/sffd_page.asp?id=57395 (accessed August 2009).

development of new parks and recreational facilities under the Project would be less than significant. Construction impacts for the development of parks under Alternative 1 would be similar to the construction impacts for the Project, and would essentially be the same impacts as discussed in Chapter III (Environmental Setting, Impacts, and Mitigation Measures) of this EIR.

At build-out of Alternative 1, the projected population within the Project site would consist of 4,194 new residents and approximately 6,200 new jobs. Compared to the Project, the CPSRA would remain 120.2 acres, compared to the 23.5-acre reduction under the Project. The total area of neighborhood parks would be reduced compared to the Project because parks would not be built at Candlestick Point. The amount of open space at HPS Phase II would also be less than the Project. The increase in population and employment could result in an increase in the use of existing parks, recreational facilities, and open space. Without a State Parks land agreement, there would be no established funding mechanism for future maintenance of the State Parks on site from the Project Applicant. Increased use of the CPSRA as a result of population and employment growth associated with Alternative 1 could result in deterioration of CPSRA facilities. This could result in a substantial adverse impact on recreational facilities at the Project site that would not occur under the Project. Without an established funding mechanism to address the increased use, improvements and maintenance of the CPSRA would be the responsibility of CDPR. Therefore, development of Alternative 1 could result in a new adverse impact on recreational facilities not identified for the Project.

In addition, Alternative 1 would not provide the substantial CPSRA improvements that would occur under the Project. These improvements, which are described at length in Section III.P (Recreation), include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), the provision of habitat and opportunities for environmental education, "Eco-Gardens," and salt-marsh restoration. These improvements would turn portions of the Park that are used for Candlestick Park stadium parking or are undeveloped and underutilized into vibrant parts of the CPSRA and of the Project's overall network of parks. Currently improved parts of the CPSRA, such as The Heart of the Park, The Point, The Neck, and The Last Port, would also be improved. Overall, the reconfiguration and improvements would enhance park aesthetics and landscape ecology, provide connections throughout the CPSRA and the other Project parks, and provide direct access to the Bay and the Bay shoreline for walking, swimming, fishing, kayaking, and windsurfing. None of these improvements would occur under Alternative 1.

Alternative 1 would not alter the windsurfing launch site at CPSRA. Since the height of structures would be limited to 65 feet under Alternative 1, large volumes of wind are not likely to be intercepted by development under Alternative 1. No impact on windsurfing would occur under Alternative 1.

Utilities

Water Supply

Construction activities associated with this alternative, including installation of new water service utility infrastructure, would be required to implement mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR, along with compliance with applicable federal, state, and local regulations. The water required for construction activities is assumed to be supplied by water trucks and/or existing sources. No construction-related impacts associated with the consumption of water would occur with this alternative.

This alternative would generate less demand for water compared to the Project. Utilizing a demand methodology similar to the Project, Alternative 1 would require approximately 0.58 million gallons per day (mgd) (including Phase I), less than the 1.37 mgd of net demand required by the Project.[1348] As stated in the Water Supply Assessment prepared for the Project, the San Francisco Public Utilities Commission (SFPUC) indicates that adequate supply would be available to satisfy all retail demand, including Project-related demand, under normal conditions (refer to Appendix Q1 [Water Supply Assessment]). Therefore, there would be sufficient water supplies to accommodate the water demand of Alternative 1, as it includes less development than under the Project. In addition, a mitigation measure adopted with certification of the Hunters Point Shipyard Final EIR would require improvements to the drinking water supply system to ensure safe potable water and adequate water pressure. Similar to the Project, implementation of Alternative 1 would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant.

The Hunters Point Shipyard Final EIR determined that the existing water system has insufficient pressure for adequate fire protection in certain portions of the Project site. Alternative 1 would be required to implement a mitigation measure adopted with certification of the Hunters Point Shipyard Final EIR that requires construction of a new auxiliary water supply system to augment the water supply for firefighting purposes. The AWSS would ensure the provision of adequate water for on-site firefighting purposes, and Alternative 1 would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements for water to fight fires. The impact would be less than significant, the same as for the Project.

Wastewater

Construction activities associated with this alternative, including installation of new wastewater treatment or collection facilities or expansion of existing facilities, would be required to implement mitigation measures adopted with certification of the Hunters Point Shipyard Final EIR, along with compliance with applicable federal, State, and local regulations.

Development under Alternative 1 would only occur at the HPS Phase II site. Wastewater from the HPS Phase II site flows into the Hunters Point tunnel sewer. The analysis in Section III.Q (Utilities) determined that wastewater generated by development under the Project would be accommodated within the remaining capacity of the Hunters Point tunnel sewer. Because water demand would be less for Alternative 1 than the Project, wastewater generation would also be less. Therefore, the sewer would have sufficient capacity to accommodate development under Alternative 1, as analyzed for the Project, and the impact would be less than significant. In addition, a mitigation measure adopted with certification of the Hunters Point Shipyard Final EIR would require that a sanitary collection system would be constructed to meet the collection needs of the development.

This alternative would not exceed wastewater treatment requirements of the applicable RWQCB, compliance with which is otherwise required by law. Compliance with any applicable permit requirements, as monitored and enforced by the SFPUC, would ensure that Alternative 1 would not exceed the applicable wastewater treatment requirements of the RWQCB. This impact would be less than significant, the same as for the Project.

[1348] Water demand for this alternative was estimated by prorating water demand for the Project (presented in Table III.Q-4) based on build-out of Alternative 1.

Solid Waste

As shown in Table III.Q-7 (Estimated Demolition Debris), it is estimated that under the Project at HPS Phase II, approximately 477,823 tons of construction waste would be produced during building demolition and approximately 69,281 tons of construction waste would be produced during road demolition. A total of approximately 547,104 tons of construction waste would be produced during building and road demolition over the build-out period for HPS under Alternative 1, compared to 971,785 tons of construction waste under the Project. Construction waste would be substantially reduced because no demolition or construction would occur at Candlestick Point. Some construction and demolition debris would be reused on site, while other materials would be transported off site for separation. Materials that cannot be reused or recycled would be transported to the landfills in the area. Alternative 1 would be subject to the City's Green Building Ordinance, which requires the diversion of at least 75 percent of construction waste. Therefore, the impact of the construction waste generated by the Alternative 1 on the capacity of the Altamont Landfill would be less than significant, and less than the Project because the total amount of construction waste would be less.

Construction activities at HPS Phase II, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. These would require disposal by a licensed transporter to a Treatment, Storage, and Disposal facility (TSD) authorized to treat such hazardous waste. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes. Because TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of HPS Phase II would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact, and less than the Project, as the total amount of hazardous waste would be less.

At full build-out, Alternative 1 would generate approximately 6,525 tons of municipal solid waste annually when all uses are fully operational and assuming no waste-reduction measures. This would represent approximately 1.1 percent of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons).[1349] All residents and businesses of the Project would be required to comply with the City's mandatory recycling and composting ordinance. Municipal solid waste remaining after sorting is currently transported to the Altamont Landfill in Livermore. The Altamont Landfill is scheduled to close in January 2029, concurrent with full build-out of the Project, and the City's existing contract with Altamont Landfill expires in 2014, likely before build-out of the Alternative. Three landfills have been identified as candidates to accommodate the City's solid waste needs after the contract with Altamont Landfill expires. The process of selection and negotiation of a new contract is anticipated to be completed by early 2010. The impact of operational solid waste generated by Alternative 1 on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant. Because the total amount of solid waste that would be generated by Alternative 1 would be less than under the Project, the impact would also be less.

[1349] Solid waste generation for this alternative was estimated using the solid waste generation rates presented in Table III.Q-8.

Specific businesses or activities that could operate under Alternative 1 are not known at this time. However, nearly all uses would involve the routine use of hazardous materials at varying levels that would require disposal. It is assumed that a variety of hazardous materials could be used in small quantities, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios, and the marina, where small quantities of fuel could be utilized. In addition, the HPS Redevelopment Plan allows maritime industrial uses, which could store and use greater quantities of hazardous materials. Since there is no established ceiling on capacities of TSDs in California and adjoining states, it is assumed there would be sufficient capacity to accommodate all anticipated hazardous wastes from such uses. New residents and businesses would be expected to comply with all hazardous waste regulations, including the disposal of household hazardous waste. Hazardous waste that would be generated by the Project could be accommodated by existing facilities, and this impact would be less than significant. Because the total amount of hazardous waste would be less than under the Project, the impact would also be less with Alternative 1.

As with all projects, this alternative would comply with all applicable federal, state, and local statutes and regulations related to solid waste. Compliance with the identified project requirement would ensure that this impact would be less than significant, the same as for the Project.

Electricity, Natural Gas, and Telecommunications

The HPS Phase II site is currently served by PG&E for electricity and natural gas and by Pacific Bell for telecommunications. Development of Hunters Point Shipyard would be subject to any mitigation measures included in the Hunters Point Shipyard Final EIR, which would reduce construction impacts from any needed infrastructure improvements to less than significant. Any subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how infrastructure needs of new development would be met. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of development such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for Alternative 1, similar to the Project

Energy

Construction activities associated with implementation of Alternative 1 would require energy sources including electricity, diesel, and gasoline. Construction activities would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy and would be subject to requirements to minimize wasteful fuel consumption. Alternative 1 would include a much smaller development program compared to the Project because development would occur at the HPS Phase II site only, and, therefore, the energy use during the construction period of Alternative 1 would be substantially less than the Project. Therefore, construction-related energy use associated with development under Alternative 1 would be less than significant, even less than the Project.

Implementation of Alternative 1 would result in baseline electricity and natural gas consumption substantially less than the Project, primarily because the development program would be reduced. Similar

to the Project, development of Alternative 1 would be subject to the requirements of Title 24 and would be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. However, development under Alternative 1 would not be required to include additional efficiency measures as proposed under the Project. Nonetheless, energy consumption at the HPS Phase II site under development of Alternative 1 would be in compliance with existing energy-efficiency standards, which would ensure that energy use is efficient and not wasteful. Therefore, energy impacts would be less than significant under development of Alternative 1, but greater than under the Project.

Alternative 1 would increase trips to and from the HPS Phase II site, thereby increasing the use of petroleum fuels. However, new trips would be substantially less than the Project because the overall development program would be substantially reduced. For development of Alternative 1, mitigation measures adopted with certification of the Final EIR for the Hunters Point Shipyard Final EIR would require implementation of a TDM program, similar to the Project. The TDM measures would be implemented to reduce automobile and light truck vehicle miles traveled and encourage residents, employees, and visitors to use alternative modes of travel, such as transit, walking, and bicycling. In addition, the TDM plan would include measures to reduce the demand for travel during peak times. With implementation of TDM measures, Alternative 1 would not be wasteful with respect to petroleum fuel consumption, and impacts would be less than significant.

Greenhouse Gas Emissions

Similar to the Project, construction activities associated with implementation of Alternative 1 would emit GHGs associated with diesel and gasoline consumption. Construction activities would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not be a prolonged source of GHG emissions. Alternative 1 would include a much smaller development program compared to the Project because development would occur at the HPS Phase II site only, and, therefore, the GHG emissions during the construction period of Alternative 1 would be substantially less than the Project. Therefore, construction-related GHG emissions and climate change associated with development under Alternative 1 would be less than significant, even less than the Project.

Implementation of Alternative 1 would result in operational GHG emissions substantially less than the Project, primarily because the development program would be reduced. Similar to the Project, development of Alternative 1 would be subject to the requirements of Title 24 and would be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Alternative 1 would increase trips to and from the HPS Phase II site, thereby increasing the use of petroleum fuels. However, new trips would be substantially less than the Project because the overall development program would be substantially reduced. For development of Alternative 1, mitigation measures adopted with certification of the Final EIR for the Hunters Point Shipyard would require implementation of a TDM program, similar to the Project. The TDM measures would be implemented to reduce automobile and light truck vehicle miles travelled and encourage residents, employees, and visitors to use alternative modes of travel, such as transit, walking, and bicycling. In addition, the TDM plan would include measures to reduce the demand for travel during peak times. In addition, similar to the Project, Alternative 1 would also be subject to the vehicle efficiency regulations and renewable portfolio standards that would reduce the GHG emissions associated with vehicles and electricity use. However, development under Alternative 1 would not include a requirement to include additional efficiency measures as proposed under the Project. In addition the development would not result

in the same reductions in trips as are associated with a larger and denser development with more local jobs. Nonetheless, GHG emissions at the HPS Phase II site under development of Alternative 1 would be in compliance with existing energy efficiency standards, vehicle efficiency measures, and renewable energy portfolio standards which would ensure that there are some reductions in GHG emissions. Therefore, GHG emissions and climate change impacts would be less than significant under development of Alternative 1.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the No Project Alternative and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change. While the No Project Alternative would include less development, it would not include the density and job creation attributes of the Project, thus the No Project Alternative would decrease the housing density, alter the service population, and not include implementation of energy efficiency measures which would impact the amount of GHG emissions per service population. Without a quantitative analysis, the comparison to the BAAQMD threshold cannot be judged, and it may not be below the threshold.

Attainment of Project Objectives

Implementation of the No Project Alternative would not meet most of the Project objectives, as no new uses would be constructed at Candlestick Point and development at HPS Phase II would proceed under land use plans and controls adopted as part of the 1997 HPS Redevelopment Plan. Because development would occur at HPS Phase II, some of the Project objectives could be met, but not to the same extent as the Project. Objectives would be partially met by development at HPS Phase II because Alternative 1 would: create public open space; create jobs and economic development; create permanent space for artists; provide neighborhood-serving retail; develop affordable housing; and transform contaminated portions of the shipyard into economically productive uses or public open space. Many objectives would not be met by the No Project Alternative because it would not include: improvements to CPSRA and development of new public open space uses at Candlestick Point; extension of the Bay Trail along the waterfront; development

of a new stadium for the San Francisco 49ers; redevelopment of the Alice Griffith Public Housing site; or creation of connections between Candlestick Point, HPS, and the larger Bayview neighborhood.

Refer to Table VI-3 (Attainment of Project Objectives—Alternative 1) below for a discussion of whether or not the Alternative achieves each objective.

Table VI-3 Attainment of Project Objectives Alternative 1

Objective	*Meets Project Objective?*	*Analysis*
1. The integrated development should produce tangible community benefits for the Bayview and the City.	Y–	Alternative 1 would include some community benefits because development would occur at HPS Phase II. However, compared to the Project, Alternative 1 would include substantially less economic development, affordable housing, parks and open space amenities, and improved connection to the existing Bayview neighborhood. Therefore, Alternative 1 would meet this objective to a lesser extent than the Project.
2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger Bayview neighborhood and should maintain the character of the Bayview for its existing residents.	Y–	Alternative 1 would include a mix of uses and urban design concepts that would provide a direct physical, visual, and architectural connection to the Bayview neighborhood and City. However, development would only occur at HPS Phase II. Alternative 1 would not provide automobile, public transportation, and pedestrian connections between HPS Phase II and Candlestick Point. Connections to the Bayview neighborhood would be substantially reduced compared to the Project. Therefore, Alternative 1 would meet this objective to a lesser extent than the Project.
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourages the rebuilding of Alice Griffith Public Housing.	N	Alternative 1 would include a substantially reduced amount of affordable housing and would not rebuild the Alice Griffith Public Housing site. Alternative 1 would not meet this Project objective.
4. The integrated development should incorporate environmental sustainability concepts and practices.	Y–	Alternative 1 would be required to meet the sustainability requirements of the City and State with regard to design of public open spaces, recreation facilities, and infrastructure including wastewater, storm water, utility, and transportation systems. Alternative 1 would not include the additional energy-efficiency measures proposed under the Project. Therefore, Alternative 1 would meet this objective to a lesser extent than the Project.
5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure.	N	Alternative 1 would not include construction of a new stadium and would not meet this Project objective.
6. The integrated development should be fiscally prudent, with or without a new stadium.	Y–	Development of Alternative 1 would increase sales tax revenue to the City and would encourage substantial private capital investment at the HPS Phase II site. However, the amount of sales tax generating use and potential private investment would be substantially less than the Project and would meet this objective to a lesser extent than the Project.

Y = Alternative <u>does</u> meet Project objective.
Y- = Alternative meets Project objective, but to a lesser extent than the Project.
Y– = Alternative meets Project objective, but to a significantly lesser extent than the Project.
N = Alternative <u>does not</u> meet Project objective.

VI.C.2 Alternative 2: CP-HPS Phase II Development Plan; No Yosemite Slough Bridge

Summarized Description

Alternative 2 would have the same land use program as the Project as presented in Project Description, Table II-3 (Proposed Land Use), except that the Yosemite Slough bridge would not be constructed. The agreement between the CDPR and the City or the Agency to reconfigure the boundaries of CPSRA, provide park improvements, and provide an ongoing source of funding for park operation and maintenance (referred to as State Parks agreement) would take place as proposed under the Project. This alternative would include a stadium at HPS Phase II.

Detailed Description

Candlestick Point

The development program at Candlestick Point under Alternative 2 would be the same as for the Project, including, residential, retail, office, community services, hotel, arena, and parks and open space. The Yosemite Slough bridge would not be constructed.

HPS Phase II

The development program at HPS Phase II under Alternative 2 would be the same as under the Project, including the stadium, residential, retail, R&D, artists' studios, community services, marina, and parks and open space.

Transportation and Circulation System (without Yosemite Slough Bridge)

- Under Alternative 2, transit and non-motorized traffic would be required to circumnavigate Yosemite Slough because no bridge would be constructed. On game days, motorized and non-motorized traffic, which would travel across Yosemite Slough Bridge under the Project, would also be required to circumnavigate Yosemite Slough because no bridge would be constructed under Alternative 2. Figure VI-1 (Alternative 2 Circulation Plan Railroad Right-of-Way for Bus Rapid Transit) illustrates the proposed route. The rest of the street network at Candlestick Point and HPS Phase II would be the same as the Project.

- Similar to the Project, under Alternative 2, the primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

Existing RR ROW

BRT Path: Using RR ROW for portion of route around Slough

Auto Route Alignment

0 500

Feet

SOURCE: SFMTA, 2010.

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FIGURE VI-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

ALTERNATIVE 2 CIRCULATION PLAN RAILROAD RIGHT-OF-WAY FOR BUS RAPID TRANSIT

Between the intersection of Carroll Avenue/Arelious Walker Drive and Crisp Road within HPS Phase II, the proposed BRT line would be routed on Carroll Avenue between Arelious Walker Drive and Hawes Street; on Hawes Street between Carroll Avenue and Armstrong Avenue (currently unimproved); and on Armstrong Avenue between Hawes Street and the Navy rail right-of-way; along the Navy rail right-of-way between Armstrong Avenue and Shafter Avenue; along Shafter Avenue between the Navy rail right-of-way and Arelious Walker Drive; and on Arelious Walker Drive between Shafter Avenue and Crisp Road (currently unimproved).

On Carroll Avenue, Hawes Street, and Armstrong Avenue to the Navy rail right-of-way, the Bus Rapid Transit (BRT) line would operate within an exclusive BRT lane and one of the two travel lanes in each direction would be transit-only. Hawes Avenue between Carroll Avenue and Armstrong Avenue and Arelious Walker Drive between Shafter Avenue and Crisp Road are currently unimproved streets and would be built out to accommodate one transit-only travel lane in each direction. The Navy rail right-of-way between Armstrong Avenue and Shafter Avenue would be improved to provide one transit-only travel lane in each direction. Shafter Avenue between the Navy rail right-of-way and Arelious Walker Drive would be reconfigured to provide four travel lanes, with BRT operating in dedicated center lanes.

Basis for Impact Analysis

For the Project, the potential impacts are generally based on the parameters of the Project, which include the size, bulk, and type of development, the footprint of development, and the number of residents, employees, and visitors to the Project site. For Alternative 2, the impacts of the Project are compared to the impacts of the same development program and parameters of the Project, except Alternative 2 would not include construction of the Yosemite Slough bridge and approach streets. The total square footage of all uses would be the same as the Project, including a new stadium at HPS Phase II.

Potential Impacts

Land Use and Plans

Implementation of Alternative 2 would require amendments similar to the Project for the following planning documents: *City of San Francisco General Plan*; *Bayview Hunters Point Redevelopment Plan*; *Hunters Point Shipyard Redevelopment Plan*; *San Francisco Bay Plan (Bay Plan); San Francisco Bay Area Seaport Plan*; and *CPSRA General Plan*. However, with implementation of the requirements and mitigation measures identified for the Project in Section III.C through Section III.S of this EIR, development under Alternative 2 would not conflict with any applicable land use plans, policies, or regulations (of an agency with jurisdiction) adopted for the purpose of avoiding or mitigating an environmental effect. Furthermore, development under this Alternative would not conflict with any of the policies, goals, and strategies analyzed for the Project. Although the Project is consistent with the Bay Plan polices with regard to Bay fill, it should be noted that development under Alternative 2 would reduce the amount of Bay fill compared to the Project, because the Yosemite Slough bridge would not be constructed. Similar to the Project, this impact would be less than significant.

Implementation of Alternative 2 would not result in a substantial adverse change in the existing land use character of the site. Without the Yosemite Slough bridge, the BRT would be routed partially along local streets and partially within the Navy right-of-way. This would change the land use character of the areas

along the BRT route, but would not be considered an adverse change, as simply adding rapid buses to the area would not materially affect land use character. Development under Alternative 2 would substantially change the character of the site from open space and industrial uses to an urbanized area representative of other areas in San Francisco. This change would improve deteriorated conditions and connectivity, as well as provide numerous areas of open space, extensive landscaped areas, pleasing architecture, and shoreline improvements, all of which would improve the character of the site. Therefore, changes resulting from development under Alternative 2 would not be considered adverse. Furthermore, the transition in scale between adjacent neighborhoods and development under this Alternative, as well as the varied range of proposed uses, would ensure that the change in the land use character is not adverse. Similar to the Project, this impact would be less than significant.

Population, Housing, and Employment

Construction activities associated with implementation of Alternative 2 would induce direct job growth at the site. The number of construction workers that would be employed during the construction period would be similar to the Project but slightly reduced because construction of the Yosemite Slough bridge would not occur. It is anticipated that construction employees would commute from elsewhere in the region, rather than relocate to the Bayview Hunters Point neighborhood for a temporary construction assignment. Thus, construction under this Alternative would not generate a substantial, unplanned population increase. Direct and indirect impacts associated with construction employment would be less than significant, the same as for the Project.

Implementation of Alternative 2 would induce direct and indirect population growth, but this growth would not be considered substantial. Similar to the Project, development under this Alternative would result in 7,850 housing units at Candlestick Point and 2,650 units at HPS Phase II, for a total of 10,500 new housing units at the Project site. Employment growth generated by development under this Alternative would result in the demand for 8,263 new housing units, which would be less than the total number of new housing units (10,500) that would be provided. The jobs and housing units that would be provided at the site would be closely balanced (approximately 10,730 jobs and 10,500 housing units) so that neither a surplus of housing nor jobs would occur that could result in indirect residential or employment growth. As a result, similar to the Project, the population and employment increase associated with development under Alternative 2 would not be substantial. This impact is considered less than significant, the same as for the Project.

Transportation and Circulation

Alternative 2 would be the same as the Project, except it would not include the Yosemite Slough bridge. Because vehicular traffic could not use the bridge on non-game days, the main roadway connection between Candlestick Point and HPS Phase II would be the same as with the Project, via Ingalls Street. The bus rapid transit (BRT) route would be along Carroll Avenue, Hawes Street, Armstrong Avenue, and the abandoned railroad right-of-way to provide access between Candlestick Point and HPS Phase II. Alternative 2 would otherwise have the same transportation improvements as proposed with the Project.

Generally, travel demand associated with all Variants and Alternatives studied would be similar with or without the Yosemite Slough bridge. Because the Yosemite Slough bridge would not accommodate auto travel on non-game days, the traffic circulation patterns are expected to be the same under Alternative 2

as the Project. Similarly, since auto traffic would only use the bridge on game days for any Alternative or Variant considered, the typical non-game day travel patterns for any of the Alternatives or Variants that include the bridge would be the same under conditions without the bridge.

Without the bridge across Yosemite Slough, the proposed new BRT route traveling between Balboa Park BART Station and the Hunters Point Shipyard Transit Center would follow a different alignment than under the Project. Instead of a direct route across Yosemite Slough, the BRT route would travel west along Carroll Avenue, north along Hawes Street, and then west on Armstrong Avenue, where it would join the Navy railroad right-of-way. The BRT route would travel in the railroad right-of-way around Yosemite Slough, rejoining the existing roadway network at Shafter Avenue. The route would continue east on Shafter Avenue to Arelious Walker, where it would reassume the same alignment as the Project.

This additional travel distance and travel time would have a notable effect on passengers who use the BRT to travel to or from the Hunters Point Shipyard (the analysis indicates a reduction of 15 percent for these trips). However, because this represents a relatively small portion of overall Project-generated transit riders, the overall change in transit ridership and auto trip generation is negligible. This conclusion applies to any Variant or Alternative that was analyzed assuming a bridge over Yosemite Slough.

Operation of the BRT within the rail right-of-way would not affect study intersection operations. Therefore, the traffic impacts associated with Alternative 2 would be the same as the Project. Similarly, traffic impacts associated with any Variant or Alternative that was analyzed assuming a bridge over Yosemite Slough would be the same as the equivalent Variant or Alternative without the bridge.

The Transportation Study analyzed Alternative 2 and conclusions from the Transportation Study are presented below.

Construction Impacts

Construction activities associated with Alternative 2 would be similar to effects with the Project. Localized construction-related traffic impacts would therefore remain significant and unavoidable.

Intersection Conditions

Alternative 2 would have similar project and cumulative effects at study intersections. The Yosemite Slough bridge would not serve vehicle traffic on game days at the football stadium; weekday conditions would be the same as with the Project. Section III.D discusses traffic effects at those intersections, and the feasibility of mitigation measures. In general, intersection conditions would be significant and unavoidable effects of Alternative 2.

During game days at the football stadium, with no Yosemite Slough Bridge, the entrance and exiting capacity for vehicles would be reduced about 40 percent compared to the Project; four out of a total 11 exit lanes would be available without the bridge. As with the Project, a mitigation measure to implement a Travel Demand Management Plan for the stadium events would reduce but not avoid traffic impacts, which would be significant and unavoidable.

Freeway Conditions

Alternative 2 freeway mainline sections effects, freeway ramp junction conditions, and ramp queuing effects would be similar to Project conditions, with significant and unavoidable impacts.

Transit Impacts

Alternative 2 transit conditions assume implementation of Project-related transit improvements. Alternative 2 would have a less than significant impact on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with Alternative 2 would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. As concluded in Section III.D, the transit delay effects would remain significant and unavoidable. During the AM and PM peak hour, Alternative 2 would require up to 28 additional vehicles, the same as with the Project.

Although the alternative BRT route around Yosemite Slough would be technically feasible, it would not be an optimal configuration for a BRT system. BRT service would provide direct, fast, and reliable travel in a dedicated right-of-way, typically with signal priority for BRT vehicles. When these elements are combined, the BRT service takes on a higher quality character than typical local bus service. The Yosemite Slough bridge would provide a dedicated right-of-way and the most direct route between Hunters Point Shipyard and points to the west, including Candlestick Point, the Bayshore Caltrain Station, and Balboa Park BART. Although the route around Yosemite Slough proposed under Alternative 2 would provide exclusive right-of-way, the route would involve a number of right-angle turns and additional signalized intersections and would not provide a comparably direct route as that provided on the bridge proposed by the Project.

Bicycle Impacts

The Alternative 2 bicycle trips would be accommodated within the proposed street and network, although there would not be a Yosemite Slough bicycle and pedestrian route; impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The Alternative 2 pedestrian trips would be accommodated within the proposed sidewalk and pedestrian network, although there would no Yosemite Slough bicycle and pedestrian route; impacts on pedestrian circulation would be less than significant.

Parking Impacts

Alternative 2, with the same land use program and parking plans as the Project, would have the same parking effects as the Project. There would be a parking shortfall, but this impact would be considered less than significant.

This alternative would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

Construction activities associated with implementation of Alternative 2 would occur during the same 19-year build-out period and involve the same activities as the Project. Like the Project, those activities would be visible to surrounding land uses and could impact views of scenic vistas and scenic resources in the area. However, any impacts to views would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Mitigation for the Project would also be implemented with this alternative that would reduce visual construction impacts to less than significant. Therefore, impacts to scenic vistas during construction of Alternative 2 would be the same as under the Project, and less than significant. Construction activities associated with Alternative 2 would not result in adverse effects on any scenic vistas and the impact would be less than significant, the same as for the Project.

There are no scenic resources on the Project site that would be adversely affected by construction of Alternative 2. As with the Project, construction activities for Alternative 2 would result in exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates that would be visible during construction of the utility infrastructure improvements, especially where right-of-way improvements are required for the route around the slough. Although these activities would take place primarily on site, views of the activities could be available from surrounding land uses. As with the Project, implementation of the identified mitigation measure (MM AE-2) would require the Project developer of Alternative 2 to screen construction sites from public view at street level, provide for appropriate staging of construction equipment, and maintain the cleanliness of construction equipment. Therefore, construction activities under Alternative 2 would have a less-than-significant impact on the visual character or quality of the site, similar to the Project.

Construction of Alternative 2 would occur during daylight hours, and, therefore, glare could be created as a result of reflection of sunlight off windows of trucks and other construction materials that have the potential to generate glare (i.e., glass); however, similar to the Project, the glare created by construction activities at the Project site would not be substantial enough to affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the Project site, and would not exceed the level of existing night lighting levels in other urban areas of San Francisco. The overall construction period would remain essentially the same as under the Project. In addition, similar to the Project, construction lighting would comply with all City lighting requirements. Therefore, construction activities for development under Alternative 2 would have less-than-significant light and glare impacts.

As shown in Figures III.E-11 through Figure III.E-18 in Section III.E (Aesthetics), development under Alternative 2 would change views of the Project site from surrounding public viewpoints, but would not substantially obstruct any scenic vistas. Alternative 2 would not introduce the new visual element of the bridge across Yosemite Slough, but the analysis for the Project determined that the bridge would not result in average long- or short-range views of the Bay or other scenic vistas. Development of Candlestick Point would not block publicly accessible views of the Bay or other scenic vistas. Views of the East Bay and the Bay from the Project site would be maintained within public access areas, as well as at City and State parks located within Candlestick Point. Similarly, development of HPS Phase II would not substantially block scenic vistas, including the Bay. Views of the East Bay and the Bay from HPS Phase II would be maintained on the site and within public access areas, such as from HPS Phase I Hilltop Park. While development of

Alternative 2 would include high-rise towers similar to the Project at Candlestick Point and HPS Phase II, those towers are not clustered and would not substantially obstruct views of the Bay or beyond from any long-range viewpoints. Therefore, similar to the Project, development under Alternative 2 would not substantially obstruct any scenic vistas, and this impact would be less than significant.

Alternative 2 would include the same development program as the Project, with the exception of the Yosemite Slough bridge. As shown by the various photographs and simulations in Section III.E, development under Alternative 2 would not substantially damage scenic resources that contribute to a scenic public setting. Alternative 2 would include replacing degraded urban areas and outdated residential development with new, well-designed urban development and integrated public parks. The Yosemite Slough bridge and roadway approaches would not be constructed and the appearance of the slough would be unchanged. Scenic resources at HPS Phase II would be retained, including the Re-gunning crane. Shoreline improvements at Candlestick Point and HPS Phase II would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 2 would not damage or remove any identified scenic resources that contribute to a scenic public setting and the impact would be less than significant.

As shown in Figures III.E-19 through Figure III.E-30, development of Alternative 2 would change the visual character of the Project site. However, similar to the Project, Alternative 2 would not substantially degrade the visual character or quality of the Project site area or its surroundings. In fact, development under Alternative 2 would improve the degraded and deteriorated condition of much of the Project site. Development under Alternative 2 would replace the existing conditions with a more dense urban setting, but this would not be considered an adverse change. The proposed shoreline improvements would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 2 would not substantially degrade the visual character or quality of the Project site or its surroundings. The impact would be less than significant.

Development under Alternative 2 would increase lighting on the Project site relative to existing outdoor lighting, and new building surfaces would increase the level of illumination in the area. Area lighting would illuminate larger areas that are well traveled so as to promote way finding and provide for a safe environment. In addition to area lighting, building lighting would be angled towards building surfaces for aesthetic purposes and/or to illuminate signs. Like the Project, both types of lighting would be designed to avoid direct visibility of the light source. City Resolution 9212 prohibits the use of highly reflective or mirrored glass in new construction. Implementation of the identified mitigation measures (MM AE-7a.1, MM AE-7a.2, MM AE-7a.3, and MM AE-7a.4) and compliance with City Resolution 9212 would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light, screening vehicle headlights to the maximum extent feasible, and eliminating or minimizing increased glare by the use of non-reflective glass and non-reflective textured surfaces within the proposed development area.

The new San Francisco 49ers stadium on the HPS Phase II site would provide a source of illumination in a different location from the existing Candlestick Park stadium. Similar to the Project, implementation of the identified mitigation measures (MM AE-7b.1 and MM AE-7b.2) would ensure that the impact of stadium lighting would be less than significant. The stadium developer would be required to test the installed field-lighting system to ensure that lighting meets the operating requirements in the stadium and minimizes obtrusive spill lighting from the facility. The impact would be less than significant.

Shadows

Development under Alternative 2 would include the same heights, layouts, and orientations of buildings as the Project. At Candlestick Point, the existing public open space, Bayview Park and Gilman Park, would not be affected by new shading from development under Alternative 2. Gilman Park would experience some shading on winter afternoons. Those shadows would be cast by buildings that do not exceed 40 feet in height, are not subject to *Planning Code* Section 295, and, therefore, would not be considered an adverse impact. Some new shadows would be cast on Bayview Park; these would have a less-than-significant effect on that park. The CPSRA would be affected by new shade in the afternoon but most areas would experience limited to no new shadow from development under Alternative 2. At HPS Phase II, the existing public open space, India Basin Shoreline Park and India Basin Open Space, would not be affected by new shading from development under Alternative 2. New shadows cast by development under Alternative 2 on proposed new parks throughout the year would range from little or no shading to large areas of certain parks receiving new shade, particularly in the late afternoon during the vernal and autumnal equinoxes. The extent and duration of shadow on new public sidewalks would increase along street corridors of Alternative 2. Similar to the Project, this new shadow would not be in excess of that which would be expected in an urban area. New shade created by implementation of Alternative 2 would occur at limited times of the day and year, and would not substantially affect the use of outdoor recreational facilities or open space. Similar to the Project, this impact would be less than significant.

Wind

Development under Alternative 2 would include structures above 100 feet in height, ranging up to 420 feet, which would extend well above surrounding buildings and intercept a large volume of wind. Because of the exposure of the tall structures to wind, the tower structures would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open space areas. The degree of change in pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. Structures nearing or over 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 miles per hour for a single hour of the year would be exceeded. Similar to the Project, the street grid of Alternative 2 would not align with predominant west and west-northwest wind directions and would, therefore, not result in channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potentially significant pedestrian-level wind acceleration at the Project site.

Implementation of the identified mitigation measure (MM W-1a) would reduce the potential impact from wind for development of Alternative 2 by requiring review of all buildings that could result in adverse wind impacts by a qualified wind consultant. If the review identifies exceedance of the wind hazard criteria, the design must be revised to reduce the impact below the established threshold. Implementation of required design changes, if any, would reduce potential hazardous wind effects at the pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas. Compliance with the mitigation measures would ensure pedestrian safety in pedestrian-access areas. Similar to the Project, through implementation of the identified mitigation measure, wind impacts would be less than significant. Elimination of the bridge would not change any of the Project's potential wind impacts.

Air Quality

As the footprint of development, the total amount of development, and the land uses provided with Alternative 2 would be virtually the same as the Project, air quality impacts of Alternative 2 would also be the same as the Project.

Construction activities for Alternative 2 would generate dust; however, they would need to comply with the San Francisco Health Code and BAAQMD requirements. Implementation of MM HZ-15, which would require the Applicant to ensure that construction contractors comply with the dust control strategies included in an approved dust control plan as part of a site-specific dust control plan, would reduce the impacts caused by construction dust to a less-than-significant level. This impact would be the same as for the Project.

Construction activities could also create DPM; however, as the development of Alternative 2 would be substantially the same as the Project, implementation of mitigation measures MM AQ-2.1 and MM AQ-2.2, accelerated emission control implementation on construction equipment, would keep this impact less than significant. Construction activities could also generate TAC-containing PM_{10}; however, as construction activities for Alternative 2 would be substantially the same as for the Project, this impact would be less than significant.

Operational emissions associated with Alternative 2 would be the same as those of the Project, therefore the mass emissions would exceed the BAAQMD CEQA thresholds, and this impact would remain significant and unavoidable, similar to the Project. Alternative 2 has the same R&D square footage, therefore potential TAC emissions from facilities in R&D areas would be the same as the Project. With the implementation of mitigation measures MM AQ-6.1 and MM AQ-6.2, this impact would be less than significant and the same as for the Project.

Additionally, as the scale of Alternative 2 is the same as the Project, the impacts from Alternative 2 traffic (e.g., carbon monoxide and $PM_{2.5}$) would be the same as for Project and less than significant.

According to the current BAAQMD CEQA Guidelines, odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that the BAAQMD regards as having potential to generate considerable odors include: wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, oil refineries, and chemical plants. Alternative 2 would be a large mixed-use development containing residential, office, retail, R&D, recreational, and entertainment uses. Although there may be some potential for small-scale, localized odor issues to emerge around proposed sources such as solid waste collection, food preparation, etc., substantial odor sources and consequent effects on on-site and off-site sensitive receptors would be unlikely and would be resolved by interventions after receipt of any complaints. This would be a less-than-significant impact, the same as for the Project.

The Project is consistent with regional air quality plans. Since Alternative 2 would have essentially the same footprint and generate the same amount of traffic, Alternative 2 would also be consistent with these plans. Alternative 2 promotes the use of alternative transportation modes, such as transit, biking and walking. In addition, it puts housing in close proximity with jobs and retail establishments, reducing the length of trips and further reducing reliance on single-occupancy vehicles. Therefore, Alternative 2 conforms to the regional air quality plan and there would be a less-than-significant impact, the same as for the Project.

Noise

As the footprint of development, the total amount of development, and the land uses provided with Alternative 2 would be the similar to the Project, noise impacts of Alternative 2 would be substantially similar to the impacts of the Project.

Construction activities for Alternative 2 would expose sensitive receptors to increased noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which generally prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. The Yosemite Slough bridge would be eliminated and noise resulting from bridge construction would be avoided. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction Best Management Practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels, similar to the Project.

Construction activities for Alternative 2 would result in a temporary or periodic increase in ambient noise that would be noticeable and likely cause for human annoyance. Construction activities would occur within 25 feet of existing and future residential uses. Pile driving activities could result in substantial noise levels of up to 107 dBA at new residential uses on the site or at adjacent existing residences. Construction-related temporary increases in ambient noise levels would be considered significant and unavoidable, the same as for the Project.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction Best Management Practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under Alternative 2, but not to a less-than-significant level, as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of Alternative 2, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with Alternative 2, such as truck deliveries, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of Alternative 2 would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project.

Football games and concerts at the proposed stadium with Alternative 2 would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measures

MM NO-7.1 and MM NO-7.2 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 60 dBA L_{max}; however, as with the Project, the feasibility and practicality of mitigation measures MM NO-7.1 and MM NO-7.2 cannot be determined at this time, and, therefore, this impact would remain significant and unavoidable.

Cultural Resources

Similar to the Project, implementation of Alternative 2 would retain Drydocks 2 and 3 and rehabilitate Buildings 140, 204, 205, and 207 at the HPS Phase II site in accordance with the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. However, development under Alternative 2 would result in the demolition of Buildings 211, 231, and 253, which are historic resources in the potential CRHR-eligible Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would result in a significant impact because the proposed actions would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of the identified mitigation measures (MM CP-1b.1 and MM CP-1b.2) would reduce those impacts; however, this alternative would not reduce impacts to a less-than-significant level. Therefore, similar to the Project, the impacts to these historical resources would be significant and unavoidable.

Construction activities associated with Alternative 2 could result in a substantial adverse change in the significance of archaeological resources. The Project site overall is likely to contain subsurface archaeological resources from the Native American, Chinese fishing village, prehistoric, and maritime development periods. The Yosemite Slough bridge would be eliminated and potential disturbance of archaeological resources resulting from bridge construction would be avoided. Similar to the Project, construction activities associated with Alternative 2 could disturb archaeological resources, and result in potentially significant impacts. Implementation of the identified mitigation measure (MM CP-2a) would reduce the effects on archaeological resources to a less-than-significant level for development under Alternative 2, similar to the Project.

Construction activities associated with Alternative 2 could result in a substantial adverse change in the significance of paleontological resources. The Bay mud underlying portions of the fill is expected to contain paleontological resources. Similar to the Project, implementation of the identified mitigation measure (MM CP-3a) would reduce the effects of construction-related activities to potential paleontological resources in in-water and off-site areas to a less-than-significant level. The impact under this alternative would be similar to the Project.

Hazards and Hazardous Materials

Under Alternative 2, the construction impacts associated with Hazards and Hazardous Materials would be slightly reduced as compared to the Project because the overall development footprint would be reduced with the elimination of the Yosemite Slough Bridge, resulting in a smaller area subject to disturbance.

Site preparation would include deep excavations for large structures such as for residential towers, with plans to use the cut material elsewhere within the Project site as fill, trenching for utility lines, dewatering, grading and compaction and other earth-disturbing activities. As portions of the site are known to contain elevated levels of chemicals in the soil, construction activities could result in exposure of construction workers, the

public or the environment to unacceptable levels of hazardous materials if not handled appropriately. MM HZ-1a would reduce effects related to exposure of known contaminants at Candlestick Point by requiring compliance with Article 22A or an equivalent process. At HPS Phase II, potential effects related to exposure to hazardous materials from construction activities would be mitigated through requirements to comply with restrictions imposed on the property through the federal site clean-up process (MM HZ-1b, MM HZ-9, and MM HZ-12). Disturbance of contaminated soil would be reduced with elimination of the Yosemite Slough bridge but would still occur. MM HZ-10b would ensure approval of workplans by the Navy and regulatory agencies prior to any work in the shoreline areas. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts from disturbance of contaminated soil, groundwater and sediments.

At both Candlestick Point and HPS Phase II, compliance with MM HZ-2a.1 would require the preparation and implementation of contingency plans to address unknown contaminants that might be encountered during construction, and compliance with MM HZ-2a.2 would require preparation and implementation of health and safety plans to protect construction workers from exposure to hazardous materials during construction activities. Construction activities could require off-site transport of contaminated soil or groundwater; compliance with federal, state, and local regulations would ensure that no unacceptable exposure to chemicals occur as a result of these activities. Further, mitigation measures MM HY-1a.1, MM HY-1a.2, and MM HY-1a.3 would ensure that no unacceptable levels of hazardous materials in soil in surface runoff or in groundwater are discharged to the sewer system or discharged from the site to the Bay. Hazardous materials impacts from all of the above construction-related activities would be reduced to less than significant with the implementation of the mitigation measures identified above, the same as for the Project.

Development under Alternative 2, as for the Project, would require the installation of foundation support piles, which could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to migrate to the deeper groundwater aquifer. However, MM HZ-5a, which requires preparation of a plan for pilot boreholes for each pile to prevent disturbance of potentially contaminated fill materials and would reduce this potential impact from pile driving to less than significant, the same as for the Project.

Elimination of construction of the Yosemite Slough Bridge would avoid impacts associated with disturbance of potentially radiologically impacted soils at HPS Phase II in the vicinity of Parcels E and E-2, thus reducing the potential for exposure to hazardous materials in soil or groundwater in this area.

All other development at HPS Phase II would be the same as that proposed for the Project and remedial activities would be the same for Alternative 2 as for the Project. Any remedial activities undertaken as part of the construction process would be subject to the requirements in MM HZ-1b, which requires construction activities at HPS Phase II to be done in accordance with all restrictions imposed on the site by the federal regulatory clean-up process and these impacts would be less than significant, the same as for the Project.

Potential impacts associated with disturbance of naturally occurring asbestos would be similar to those associated with the Project and would be mitigated through MM HZ-15, which requires the preparation of dust control plans as required by BAAQMD and DPH. Alternative 2 would involve the demolition of existing structures that may contain asbestos-containing building materials, lead-based paint and other

hazardous materials, the same as the Project. The existing regulatory framework and approval process would avoid potential hazards from demolition or building preservation activities and impacts would be less than significant, the same as the Project.

Alternative 2 would involve off-site roadway improvements, which could result in disturbance of hazardous material in soil or groundwater. Unacceptable exposures would be controlled as for the Project by implementation of MM HZ-1a, and hazardous materials impacts from these activities would be less than significant.

Project operations would involve routine use, storage, transport, or disposal of hazardous materials. The use of such materials would be the same as for the Project, as the development program is essentially the same. Compliance with applicable federal, state, and local regulations related to the use, storage and transport of such materials would result in a less-than-significant impact from hazardous materials usage, the same as for the Project.

Geology and Soils

Construction activities, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. However, requirements to control surface soil erosion during and after construction of Alternative 2 would be implemented through the requirements of the identified mitigation measure (MM HY-1a.1), and adverse effects on the soil such as soil loss from wind erosion and stormwater runoff would be reduced to a less-than-significant level. Soil erosion impacts associated with construction of the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 2.

Construction activities would have the potential to affect groundwater levels. Construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. The dewatering could cause settlement of adjacent soils that could damage the overlying foundations of existing buildings. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by the identified mitigation measure (MM GE-2a), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Similar to the Project, settlement hazards related to dewatering would be less than significant for development under Alternative 2.

Development of Alternative 2 would require rock removal activities at the Alice Griffith and Jamestown districts that could result in damage to structures from vibration or settlement caused by the fracturing of bedrock for excavation. With implementation of the identified mitigation measure (MM GE-3), vibration from controlled rock fragmentation in the area would not cause unacceptable settlement at adjacent or nearby properties. Similar to the Project, settlement hazards related to controlled rock fragmentation would be less than significant for development under Alternative 2.

The potential for exposure to adverse effects caused by seismic groundshaking and seismically induced ground failure such as liquefaction, lateral spreading, landslides and settlement exists at the Project site. The identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-5a, and MM GE-6a) would require design-level geotechnical investigations for development under Alternative 2. Design-level

geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of structures, as required by the SFBC through review by DBI. The structural design review would ensure that all necessary mitigation methods and techniques are incorporated in the design for foundations and structures to reduce potential impacts from ground failure or liquefaction to a less-than-significant level for development under Alternative 2. Seismic-related groundshaking hazards associated with the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 2, although these impacts are mitigated to less than significant under the Project.

The existing shoreline exhibits active erosion and consists of areas of unprotected slopes and dilapidated naval pier and wharf structures. Similar to the Project, Alternative 2 would include numerous shoreline improvements, including additional concrete revetments, creation of new beach and tidal habitat, and some grading and importation of fill at certain locations. These improvements would increase the stability of the shoreline. Therefore, Alternative 2 would not result in the exposure of structures and facilities at the Project site to substantial adverse effects caused by shoreline instability. Similar to the Project, the impact would be less than significant.

The potential for adverse effects caused by landslides, settlement, expansive and corrosive soils, exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual elements of development for Alternative 2, as specified in the identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-5a, MM GE-6a, MM GE-10a, MM GE-11a) for the Project. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of those mitigation measures, impacts with regards to landslides, settlement, and expansive and corrosive soils would be less than significant. Potential ground failure impacts associated with the Yosemite Slough bridge would be avoided because no bridge would be constructed under Alternative 2, although these impacts are mitigated to less than significant under the Project.

Hydrology and Water Quality

The footprint of development for Alternative 2 would be the same as for the Project, although the Yosemite Slough Bridge would not be constructed. As such, impacts from construction of Alternative 2 would be similar to the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts to hydrology and water quality would be the same as with the Project.

With adherence to applicable regulatory requirements, construction activities associated with Alternative 2 would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. As the footprint of development, and the total amount of development would be the same as the proposed project with the exception of the construction of the Yosemite Slough Bridge, impacts would be similar to the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

Groundwater would not be used for any construction activities such as dust control or irrigation of vegetated erosion control features; no groundwater wells would be developed as part of the Project or and no on-site groundwater wells would be used for water supplies. Short-term construction groundwater dewatering may be necessary at certain locations (e.g., for installation of building foundations or underground utilities), but dewatering would have only a minor temporary effect on the groundwater surface table elevation in the immediate vicinity, and would not measurably affect groundwater supplies. Under Alternative 2, the extent of impervious surfaces would be the same as the Project, and would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the Project site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of Alternative 2, the existing drainage patterns within the area would generally be preserved. Construction activities associated with Alternative 2 would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated Alternative 2, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2, (preparation of a SWPPP) impacts would be less than significant, similar to the Project.

Operation of Alternative 2 would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of Alternative 2. In addition, this alternative would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the Project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the extent of impervious surfaces for Alternative 2 is the same as the Project, impacts would be the same as the Project. Development of

Alternative 2 would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of Alternative 2 could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on or off site, similar to the project. Implementation of Alternative 2 would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a Stormwater Drainage Master Plan (SDMP) and Stormwater Control Plan (SCP) to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of Alternative 2 would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of Alternative 2 would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, Alternative 2 would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

Similar to the Project, Alternative 2 would involve removal and/or modification of areas that have the potential to contain special-status species, including: seven potentially breeding avian species, one bat species, and four fish species (green sturgeon, Chinook, steelhead, and longfin smelt). Alternative 2 would also have the potential to affect designated critical habitat of the green sturgeon and Central California Coast steelhead and thus, directly impact threatened and/or endangered species through habitat conversion or unauthorized take. In addition, activities would occur within habitats of locally rare or sensitive species such as Pacific herring and Olympia oysters, as well as avian species protected by the *Migratory Bird Treaty Act* (MBTA). Alternative 2 would include implementation of the ecological design features described in the Project's Draft Parks, Open Space, and Habitat Concept Plan that would result in multiple measures to avoid, limit, and mitigate for impacts to special-status and legally protected species. Specifically, the design components would remove invasive species; restore, preserve, and enhance wetland, aquatic, and grassland habitats; revegetate the site with extensive planting of trees and shrubs; increase the vegetative cover for foraging and dispersing animals; and maintain and enhance habitat connectivity along the shoreline. Alternative 2, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-6a.1, MM BI-6a.2, MM BI-6b, MM BI-7b, MM BI-9b, MM BI-18b.1, and

MM BI-18b.2) and ecological design features, would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or United States Fish and Wildlife Service (USFWS). Similar to the Project, this impact would be less than significant after mitigation for development under Alternative 2. However, impacts to such species would be less than the Project due to the avoidance of impacts associated with bridge construction and operation.

Similar to the Project, development of Alternative 2 could have a substantial adverse effect on sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFG or USFWS. The only sensitive habitats other than wetlands and aquatic habitats are eelgrass and areas designated as Essential Fish Habitat (EFH). Shoreline improvements, shoreline abutments for the proposed marina and installation of the breakwater at HPS Phase II could have substantial adverse impact to the communities. However, with implementation of the identified mitigation measures (MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12b.1, MM BI-12b.2, MM BI-12b.3, MM BI-18b.1, MM BI-18b.2, MM BI-19b.1, and MM BI-19b.2), impacts of Alternative 2 on sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFG, NMFS, or USFWS would be reduced to a less–than-significant level. Potential impacts to eelgrass beds would be the same as the Project (eelgrass beds are not located near Yosemite Slough), while impacts to EFH would be less than the Project since construction associated with Yosemite Slough bridge would be avoided and, thus, EFH would not be impacted through the construction of pilings required to support the bridge.

The shoreline improvements included in Alternative 2 would be similar to the Project and could have substantial temporary and permanent adverse effect on federally protected wetlands and other waters as defined by Section 404 of the *Clean Water Act* (CWA) (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. Those impacts would be reduced (0.01 acre of tidal salt marsh, 0.70 acre of other waters, and 0.96 acre of shadow fill) compared to the Project because the Yosemite Slough bridge would not be constructed. Therefore, potential impacts to federally protected wetlands and other waters would be less than the Project. The identified mitigation measures would reduce the effects of construction-related activities to wetlands and other waters by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation, preservation, and/or restoration), obtaining permits from the US Army Corps of Engineers (USACE), the San Francisco Regional Water Quality Control Board (SFRWQCB), and BCDC that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. With implementation of the identified mitigation measures (MM BI-4a.1 and MM BI-4a.2), the impacts of development under Alternative 2 to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level.

Development of Alternative 2 could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. The Project site is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways occur within the Project site. However, similar to

the Project, implementation of Alternative 2 would place new residential towers and a stadium with light towers along a portion of the San Francisco Bay shoreline. The increase in strike hazards from the tall buildings and the potential for lighted stadium towers to alter flight paths could substantially interfere with migratory avian flight paths, which would be considered a potentially significant impact to migratory birds. With respect to aquatic species, although migratory fish could continue to move though the open water and Yosemite Slough, the Project site does not contain any substantial migratory fish pathways such as anadromous fish streams. However, construction of breakwaters and other shoreline treatments in HPS Phase II would occur near eelgrass beds, which could directly or indirectly impact eelgrass beds such that productivity and survival of these habitats would be substantially reduced. Similar to the Project, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-20a.1, and MM BI-20a.2), the potential impacts of Alternative 2 would be reduced to a less-than-significant level because it would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Similar to the Project, Alternative 2 would be required to comply with mitigation measure MM BI-14a to ensure that Project development would not result in conflicts with the City's tree protection ordinances. With implementation of MM BI-14a, Alternative 2 would not conflict with any local policies or ordinances protecting biological resources and impacts would be less than significant, similar to the Project.

Public Services

Police Protection

During construction of Alternative 2, emergency access to the Project site would be maintained through compliance with the CTMP, as required by mitigation measure MM TR-1. The purpose of a CTMP is to ensure that the impacts of construction on the public domain, in particular with respect to temporary interruptions to vehicular and pedestrian traffic, are considered and addressed. Because Alternative 2 would include the same mitigation as the Project, there would be a similar requirement to prepare a CTMP for Alternative 2 that would address temporary impacts on circulation during construction. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. Construction activities associated with implementation of Alternative 2 also could increase demand for SFPD services if the site is not adequately secured, providing increased opportunity for criminal activity. To ensure adequate site security, mitigation measure MM PS-1 would require the Project Applicant to provide security during construction. Therefore, this impact would be less than significant, the same as for the Project.

Implementation of Alternative 2 would increase resident and employee population at the Project site, resulting in a potential increase in the need for 53 additional police personnel to provide a comparable level of service to existing conditions, the same as for the Project. The SFPD evaluates the need for additional officers by sector, and not station or district needs. While it is unlikely that 53 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development of Alternative 2.

If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 square feet (sf) could be constructed within the Project site, on land designated for community-serving uses. As part of this alternative, up to 100,000 gross square feet (gsf) divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses, including a police station. Construction of a new SFPD facility (counter, storefront, or other configuration) within these community services uses and/or the reconfiguration or expansion of the existing Bayview Station would be funded by the Project Applicant. Similar to the Project, Alternative 2 includes community service use areas, and as construction would be funded by the Project Applicant, the SFPD would maintain acceptable levels of police service. Therefore, development of this Alternative would not require new or physically altered police facilities beyond the scope of the Project in order to maintain acceptable police services. This impact is considered less than significant, similar to the Project.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Fire and Emergency Medical Services

During construction of Alternative 2, emergency access to the Project site would be maintained through compliance with the CTMP, required by mitigation measure MM TR-1. Alternative 2 would add 10,500 residential units and substantially increase employment-generating uses, resulting in an employment population of 10,730. The increase in the residential and daytime employment population (for a total population of 35,195, including a residential population of 24,465 plus 10,730 employees), combined with an increase in the intensity of physical development on the Project site, would result in new demand for fire protection and emergency medical services. As Alternative 2 would implement the same land use program as the Project, the demand for emergency services would be the same as for the Project.

Construction of a new SFFD facility on land designated for community-serving uses on the Project site (where costs would be borne by the Project Applicant), would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. Similar to the Project, construction of 100,000 gsf of community facilities, which would include a new SFFD facility, would be included as a component of Alternative 2. Similar to the Project, prior to construction of new land uses at HPS Phase II, review of access strategies for game day and non-game day scenarios would be required pursuant to the SFFD's plan review requirements.[1350] Therefore, development under Alternative 2 would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is considered less than significant.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

[1350] San Francisco Fire Department, Plan Check website. http://www.sfgov.org/site/sffd_page.asp?id=57395 (accessed August 2009).

Schools

A total of approximately 2,131 school-age children would live within the Project site following full build-out of Alternative 2. While schools in the Project vicinity have approximately 49 percent capacity remaining in the 2008/09 school year, it is likely that a 12 percent overcapacity of SFUSD as a result of citywide population growth by 2030 would occur. Similar to the Project, the payment of school impact fees pursuant to SB 50 would constitute full mitigation for any potential schools impacts. This impact is considered less than significant for development under Alternative 2, the same as for the Project.

Libraries

Construction of Alternative 2 would not result in impacts to the San Francisco Public Library system (SFPL). No library branches are located on the Project site. All library services would be available to the community throughout the duration of construction. As such, no impact to library services during construction of Alternative 2 would occur.

Residential and nonresidential development associated with Alternative 2 would increase demand for local library services in the Bayview neighborhood. Although this alternative would result in a substantial direct and indirect population increase within the Bayview neighborhood, library branches serving the Project site, including the Portola, Visitacion Valley, and the Bayview branches would continue to meet the demands of the community. In addition to the three library branches serving Alternative 2, the proposed development would include space dedicated to library services to supplement the Bayview branch library. As part of Alternative 2, a 1,500 gsf reading room and automated book-lending machines would be integrated into the community retail and public facilities uses. The SFPL branches, and the dedication of space to accommodate library services on the Project site in order to supplement SFPL branches, would accommodate increased demand from development under this Alternative. No additional library facilities would be required to accommodate development of Alternative 2. Therefore, no new or physically altered library facilities would be required in order to maintain acceptable service ratios and this impact is considered less than significant for development under Alternative 2, the same as for the Project.

Recreation

Implementation of Alternative 2 would include the same parks and open space areas as the Project. Similar to the Project, Alternative 2 would also include a land agreement with the CPSRA, which would result in improvements to the CPSRA. Construction activities associated with the proposed parks and recreational facilities are considered part of the overall development footprint. Since this Alternative is so similar to the Project, construction impacts anticipated to result from implementation of this Alternative are analyzed throughout the technical sections of this EIR. Such impacts would be temporary and would be mitigated by measures identified in Section III.D (Transportation and Circulation), Section III.H (Air Quality), Section III.I (Noise), and Section III.K, Section III.M, and Section III.N (Biological Resources). These measures address construction-related impacts including, but not necessarily limited to, traffic and circulation, air quality, noise, exposure to hazardous material, and soil erosion, which would help reduce potential impacts to recreational resources. Construction impacts associated with development of new parks and recreational facilities would, therefore, be less than significant as demonstrated in the sections referred to above, the same as for the Project

At build-out of Alternative 2, the projected population within the Project site would increase from approximately 1,113 residents to approximately 24,465 residents, while employment would increase from 529 jobs to approximately 10,730 jobs. Similar to the Project, parks and open space included in Alternative 2 would provide a ratio of about 14 acres of parkland per thousand residents, which is substantially higher than the benchmark ratio of 5.5 acres per thousand residents (refer to Section III.P). The increase in population and employment could result in an increase in the use of existing parks, recreational facilities, and open space. However, similar to the Project, new and improved parks, recreational facilities, and open space would be provided as part of this alternative and would meet the increase in demand created by new residents and employees. During a given phase, however, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual, and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed. Therefore, Alternative 2 would not result in substantial physical deterioration of existing parks and recreational facilities and impacts associated with the increase in demand for parks and open space would be less than significant, the same as for the Project.

The high-frequency BRT route around Yosemite Slough, rather than over the slough on the Yosemite Slough bridge as proposed under the Project, presents more at-grade bicycle and pedestrian conflicts for residents of the Bayview District seeking access to the slough and the Bay Trail. In the Project, the BRT is physically separated from the Bay Trail and connecting bicycle/pedestrian trails, eliminating crossing conflicts between the Bay Trail and the Bayview. This is a potentially significant impact that would not occur under the Project.

A windsurfing launch site is located in CPSRA. The tower plan at Candlestick Point would be the same as the Project. Windsurfing could potentially be impacted by the construction of tall structures at Candlestick Point in close proximity to the Bay that affect wind patterns and direction. Similar to the Project, windsurfing would not be substantially affected by build-out of Alternative 2.

Utilities

Water Supply

Alternative 2 would include the same water infrastructure as the Project. Impacts of construction activities associated with this infrastructure, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J (Cultural Resources and Paleontological Resources), Section III.K, Section III.L (Geology and Soils), Section III.M, Section III.O (Public Services), and Section III.S (Greenhouse Gas Emissions) of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of water conveyance or treatment infrastructure associated with the Project. The water required for construction activities is assumed to be supplied by water trucks and/or existing sources. No construction-related impacts associated with the consumption of water would occur with Alternative 2.

Alternative 2 would have the same residential and non-residential build-out as the Project and generate a total demand of approximately 1.67 mgd. As current water use from existing land uses at the Project site is approximately 0.3 mgd, the net effect of the Alternative 2 on water demand would be an increase of

approximately 1.37 mgd.[1351] As stated in the Water Supply Assessment provided for the Project, the SFPUC projects that adequate supply would be available to satisfy all retail demand, including Project-related demand, under normal conditions (refer to Appendix Q1). Therefore, there would be sufficient water supplies to accommodate the water demand of Alternative 2. This is considered to be a less-than-significant impact. Similar to the Project, implementation of Alternative 2 would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant.

Implementation of Alternative 2 would require expansion of the existing off-site AWSS by providing an AWSS loop at Candlestick Point that would connect to the planned extension of the existing off-site AWSS on Gilman Street from Ingalls Street to Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road. Implementation of the identified mitigation measure (MM UT-2) would ensure the provision of adequate water for on-site fire-fighting purposes, and the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements for water to fight fires. The impact is less than significant with implementation of this mitigation measure, the same as for the Project.

Wastewater

Under Alternative 2, the Candlestick Point development would discharge a maximum peak flow of 1,479 gpm to the Candlestick tunnel sewer, which has an existing unused capacity of 28,035 gpm in dry weather. This flow would combine with a maximum peak flow of 979 gpm from the HPS Phase II into the Hunters Point tunnel sewer. The total maximum peak Project flows of 2,458 gpm would combine in the Hunters Point tunnel sewer, which has an existing unused capacity of 69,853 gpm in dry weather. This represents 3.5 percent of the available capacity of the Hunters Point tunnel sewer, which could be accommodated by the existing off-site infrastructure.

The wastewater generated under Alternative 2 would be the same as the Project. As with the Project, it is possible that a temporary increase in CSO volume could occur during wet weather if structures are occupied and contribute wastewater to the Combined Sewer System prior to completion of the separate stormwater and wastewater infrastructure of Alternative 2. Implementation of the identified mitigation measure (MM UT-3a) would ensure that there would be no increase in CSO flows as a result of the Project by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. The impact on the Combined Sewer System would be reduced to less than significant, the same as the Project

The wastewater generated under Alternative 2 would be the same as the Project. The current remaining treatment capacity of the SWPCP would accommodate the increase in wastewater flows from the Project development. Overall flows during wet weather would decrease, indicating that the proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows, assuming completion of utility infrastructure prior to occupancy of Alternative 2. Based on this analysis, the overall volumes in the Bayside system during wet weather would be less than under existing conditions with implementation of the Project. It is possible that a temporary increase in CSO volume could occur

[1351] Water demand for this alternative was estimated by prorating water demand for the Project (presented in Table III.Q-4) based on build-out of Alternative 2.

(which could affect the capacity of the SWPCP for treatment) during wet weather, as noted, above. Implementation of the identified mitigation measure (MM UT-3a) would reduce this impact to less than significant by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. Thus, the Project would not result in any net increase in CSO volume in the Bayside system during wet weather. A less-than-significant impact to existing off-site treatment facilities would occur, the same as the Project

Development associated with Alternative 2 would incrementally contribute wastewater during dry and wet-weather events to the Combined Sewer System operated by the SFPUC, but overall, wet-weather volumes would decrease in the Bayside system with construction of the Project's separate stormwater and wastewater systems. Compliance with any applicable permit requirements, as monitored and enforced by the SFPUC, would ensure that the Alternative 2 would not exceed the applicable wastewater treatment requirements of the RWQCB. In addition, Alternative 2 would not cause the City to exceed the requirements of the NPDES permit for the reasons previously stated and because the flows during wet weather would actually decline compared to existing flows from the Project site. This impact would be less than significant, the same as the Project.

Solid Waste

Demolition of existing facilities within the Project site under Alternative 2 would generate approximately 971,785 tons of construction debris. Some construction and demolition debris would be reused on site, while other materials would be transported off site for separation. Materials that cannot be reused or recycled would be transported to the landfills in the area. With implementation of the identified mitigation measure (MM UT-5a), the Project Applicant would be required to submit a Waste-Diversion Plan demonstrating strategies to divert at least 75 percent of total construction wastes before receiving building permits. This would reduce construction debris transported to the landfill to 25 percent, or 242,946 tons. At an average density of 1 ton per cubic yard, this equals 242,946 cubic yards, or 0.5 percent of the available capacity at Altamont Landfill as of 2009.

At current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1352] Under Alternative 2, demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 65 percent of construction waste, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Alternative 2 on solid waste would be further reduced. The impact of the construction waste generated by the Alternative 2 on the capacity of the Altamont Landfill would be less than significant, substantially similar to the Project.

Construction activities, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. These would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur

[1352] CIWMB, 2009.

intermittently during the construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes (refer to Setting). Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. Contaminated soils may require transportation off site and treatment at authorized TSDs. Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of Alternative 2 would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact, substantially similar to the Project.

At full build-out, Alternative 2 would generate approximately 21,827 tons annually when all uses are fully operational and assuming no waste-reduction measures. This would represent approximately 3.7 percent of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons). All residents and businesses of Alternative 2 would be required to comply with the City's mandatory recycling and composting ordinance. In addition, consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant would prepare a Site Waste Management Plan as required by the identified mitigation measure (MM UT-7a.1) that would specify the methods by which the Alternative 2 would divert operational solid waste to assist the City in achieving its diversion goals. The impact of operational solid waste generated by Alternative 2 on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant, the same as the Project.

Nearly all uses under Alternative 2 would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this stage of Project development. Therefore, it is assumed that a variety of hazardous materials could be used in small quantities, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios, and the marina, where small quantities of fuel could be utilized. The amounts of hazardous waste that would be generated by such uses would not be substantial. In addition, new residents and businesses would be expected to comply with all hazardous waste regulations, including the disposal of household hazardous waste. Because the minimal amount of hazardous waste that would be generated by the Alternative 2 could be accommodated by existing TSD facilities, this impact would be less than significant, the same as the Project.

Electricity, Natural Gas, and Telecommunications

The proposed utility infrastructure improvements for Alternative 2 would include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications, the same as for the Project. As the only difference between this alternative and the Project is the elimination of the Yosemite Slough bridge and diversion of traffic around the Yosemite Slough instead of across it, utility infrastructure would not be substantially different from that proposed under the Project. Therefore, impacts would remain the same as the Project, and less than significant.

Energy

Construction activities associated with implementation of Alternative 2 would require energy sources including electricity, diesel, and gasoline. Similar to the Project, the construction activities for Alternative 2 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy and would be subject to requirements to minimize wasteful fuel consumption. Energy use during the construction period would be similar to the Project but slightly reduced because construction of the Yosemite Slough bridge would not occur. Furthermore, given the type of development proposed under this Alternative, the energy demand created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related energy use associated with development under Alternative 2 would be considered less than significant.

Implementation of Alternative 2 would result in baseline electricity consumption similar to the Project and would include the energy savings associated with the Project Applicant's commitment to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project, those efficiency measures would result in consumption of at least 5.4 percent less electricity than a project that would not implement such measures. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts of Alternative 2 to less than significant.

Implementation of Alternative 2 would result in baseline natural gas consumption similar to the Project and would include efficiency measures similar to the Project resulting in the use of approximately 13 percent less natural gas than a development project without such measures. Those efficiency measures would result in consumption of at least 13 percent less natural gas than a development project without such measures. In addition, the Project Applicant will also implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity and the use of solar thermal energy to provide space cooling with the use of absorption systems and/or water for space heating and domestic water systems. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential natural gas consumption impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

Alternative 2 would increase trips to and from the Project site, increasing the use of petroleum fuels. Based on average fuel efficiencies for the City and a VMT similar to that of the Project, this Alternative would result in a demand for 14.01 million gallons of gasoline and 0.93 million gallons of diesel annually. Similar to the Project, fuel consumption resulting from travel to and from the Project site would be five times as high as under existing conditions, indicating a large increase in consumption. However, this consumption would not be wasteful because (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. However, Alternative 2 lacks the direct, grade-separated BRT connection between Candlestick Point and HPS Phase II that the Yosemite Slough bridge would provide in the Project. This would result in an estimated delay of up to 7 minutes in transit travel times, which would result in fewer transit trips and more automobile trips and an increase in consumption of energy. Similarly, reductions in walking and bicycle trips between Candlestick Point and HPS Phase II that would be accommodated on the Project's bridge could result in increased drive trips and energy use.

Nevertheless, these reductions in transit, bicycle, and pedestrian trips and resulting increases in automobile trips would not likely create a significant energy consumption impact when compared to the Project. Therefore, similar to the Project, Alternative 2 would not be wasteful with respect to petroleum fuel consumption, and impacts are considered less than significant.

Greenhouse Gas Emissions

Similar to the Project, construction activities associated with implementation of Alternative 2 would emit GHGs associated with diesel and gasoline consumption. Similar to the Project, the construction activities for Alternative 2 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not be a prolonged source of GHG emissions. GHG emissions during the construction period would be similar to the Project but slightly reduced because construction of the Yosemite Slough bridge would not occur. Furthermore, given the type of development proposed under this Alternative, the GHG emissions created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related GHG emissions and climate change associated with development under Alternative 2 would be considered less than significant.

Implementation of Alternative 2 would result in baseline GHG emissions similar to the Project and would include the GHG emission reductions associated with mitigation measures, including MM GC-1 through MM GC-4, which require the implementation of the Project Applicant's conceptual commitments to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project, Alternative 2 would increase trips to and from the Project site compared to existing conditions, increasing the GHG emissions associated with transportation.

However, this Alternative would also include the Project Applicant's commitment to reduce transportation related GHG emissions: (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of GHGs emitted by shortening trip lengths and shifting trips from vehicular modes of travel. Similar to the Project, those efficiency measures would result in approximately 51 percent less GHG emissions than a project that would not implement such measures. However, Alternative 2 lacks the direct, grade-separated BRT connection between Candlestick Point and HPS Phase II that the Yosemite Slough bridge would provide in the Project. This would result in an estimated delay of up to 7 minutes in transit travel times, which would result in fewer transit trips and more automobile trips and an increase in consumption of energy. Similarly, reductions in walking and bicycle trips between Candlestick Point and HPS Phase II that would be accommodated on the Project's bridge could result in increased drive trips and energy use.

Nevertheless, these reductions in transit, bicycle, and pedestrian trips and resulting increases in automobile trips would not likely create a significant energy consumption impact when compared to the Project. Similar to the Project, Alternative 2 would not be wasteful with respect to petroleum fuel consumption. Thus, GHG emissions at the Project site under development of Alternative 2 would not inhibit the achievement of the goals of AB 32 or the SFCAP. Similar to the Project, GHG emissions and climate change impacts would be less than significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for Alternative 2 and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO2e per service population per year and would result in a less-than-significant impact on climate change. Alternative 2 would not measurably change the parameters of the Project land use program, and thus this analysis applies to Alternative 2.

Attainment of Project Objectives

Alternative 2 would meet most of the Project objectives, although it would meet transportation-related objectives to a lesser extent than the Project because this Alternative would not include the Yosemite Slough bridge. Refer to Table VI-4 (Attainment of Project Objectives Alternative 2) below for a discussion of each objective.

Table VI-4 Attainment of Project Objectives Alternative 2

Objective	*Meets Project Objective?*	*Analysis*
1. The integrated development should produce tangible community benefits for the Bayview and the City.	Y-	Alternative 2 would include the same development program and uses as the Project, resulting in the same range of job and economic development opportunities. This alternative would renovate and replace the artist studios at HPS Phase II and create a permanent space for artists. Alternative 2 would include the same shoreline improvements and open space network including a Bay Trail extension along the shoreline and the same improvements to the CPSRA as the Project. However, there would be no grade-separated, direct transit connection and no continuous shoreline and open space access between Candlestick Point and HPS Phase II because the Yosemite Slough bridge would not be constructed. Therefore, while Alternative 2 would meet this Project objective, it would not meet it to as great an extent as the Project.
2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger Bayview neighborhood and should maintain the character of the Bayview for its existing residents.	Y-	Alternative 2 would include the same development program and uses as the Project. The proposed mix of uses and urban design concepts would provide a direct physical, visual, and architectural connection to the Bayview neighborhood and City. This alternative also includes extension of the transportation network into the Project site. Those connections would allow residents of the Bayview neighborhood and City to access the commercial, cultural, and institutional opportunities at the Project site. However, this alternative would not include the Yosemite Slough bridge (thereby precluding a direct connection between CP and HPS, particularly for transit). Therefore, while Alternative 2 would meet this Project objective, it would not meet it to as great an extent as the Project.
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourages the rebuilding of Alice Griffith Public Housing.	Y	Alternative 2 would include a variety of unit types, sizes, and structures, and a wide range of affordability levels. This alternative would also include the redevelopment of the Alice Griffith Public Housing site. Therefore, Alternative 2 would meet this Project objective.
4. The integrated development should incorporate environmental sustainability concepts and practices.	Y	Alternative 2 would include the same sustainability principles and concepts as the Project. Therefore, Alternative 2 would meet this Project objective.
5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure.	N	Alternative 2 would provide automobile, public transportation, and pedestrian connections similar to the Project. However, this alternative would not include construction of the Yosemite Slough bridge. Therefore, this Alternative 2 would not facilitate the efficient handling of game day traffic to as great an extent as the Project. Therefore, Alternative 2 would not meet this Project objective.
6. The integrated development should be fiscally prudent, with or without a new stadium.	Y	Development of Alternative 2 would increase sales tax revenue to the City to a similar extent compared to the Project and include a development program that would encourage substantial private capital investment. Alternative 2 would meet this Project objective.

Y = Alternative does meet Project objective.
Y- = Alternative meets Project objective, but to a lesser extent than the Project.
Y– = Alternative meets Project objective, but to a significantly lesser extent than the Project.
N = Alternative does not meet Project objective.

Alternative 2 analyzes the full Project land use program without construction of the Yosemite Slough bridge. Generally, travel demand associated with all Variants and Alternatives studied would be similar with or without the Yosemite Slough bridge. Because the Yosemite Slough bridge would not accommodate auto travel on non-game days, the traffic circulation patterns are expected to be the same under Alternative 2 as the Project. Similarly, since auto traffic would only use the bridge on game days for any Alternative or Variant considered, the typical non-game day travel patterns for any of the Alternatives or Variants that include the bridge would be the same under conditions without the bridge. If Variants 1 (R&D Variant), Variant 2 (Housing Variant), or Variant 2A (Housing/R&D Variant) were approved, and no bridge were constructed, the impacts would not increase from those identified for Variant 1, Variant 2, or Variant 2A with the bridge. In fact, all operational and construction impacts associated with the bridge, although identified as less than significant, would be eliminated.

Without the bridge across Yosemite Slough, the proposed new BRT route traveling between Balboa Park BART Station and the Hunters Point Shipyard Transit Center would follow a different alignment than under the Project. Instead of a direct route across Yosemite Slough, the BRT route would travel west along Carroll Avenue, north along Hawes Street, and then west on Armstrong Avenue, where it would join the Navy railroad right-of-way. The BRT route would travel in the railroad right-of-way around Yosemite Slough, rejoining the existing roadway network at Shafter Avenue. The route would continue east on Shafter Avenue to Arelious Walker, where it would reassume the same alignment as the Project.

This additional travel distance and travel time would have a notable effect on passengers who use the BRT to travel to or from the Hunters Point Shipyard (the analysis indicates a reduction of 15 percent for these trips). However, because this represents a relatively small portion of overall Project-generated transit riders, the overall change in transit ridership and auto trip generation is negligible. This conclusion applies to any Variant or Alternative that was analyzed assuming a bridge over Yosemite Slough.

Operation of the BRT within the rail right-of-way would not affect study intersection operations. Therefore, the traffic impacts associated with Alternative 2 would be the same as the Project. Similarly, traffic impacts associated with any Variant or Alternative that was analyzed assuming a bridge over Yosemite Slough would be the same as the equivalent Variant or Alternative without the bridge.

VI.C.3 Alternative 3: Reduced CP-HPS Phase II Development; San Francisco 49ers Stay at Existing Candlestick Park Stadium; Limited State Parks Agreement; Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians

Summarized Description

Alternative 3 is a reduced-development alternative, including a reduction in residential units by approximately 50 percent and by approximately 28 percent in commercial development. This alternative assumes that the 49ers football team would continue to use the existing Candlestick Park stadium and HPS Phase II would not include a new stadium. Consequently, the population growth anticipated under this alternative would be approximately 12,319 compared to approximately 24,465 under the Project. A limited State Parks agreement would occur to allow redevelopment of the Alice Griffith Public Housing site and construction of the Yosemite Slough bridge and approach. Alternative 3 would not include other new development at Candlestick Point.

Table VI-5 (Comparison of Alternative 3 and Project Build-Out) presents a comparison of the uses proposed on the Project site under the Project and Alternative 3. Figure VI-2 (Alternative 3 Land Use Plan) illustrates the land use plan for Alternative 3.

Detailed Description

Candlestick Point

New development at Candlestick Point with Alternative 3 would include replacement of the Alice Griffith Public Housing and the construction of 1,210 additional housing units at the site. Alternative 3 would include a limited State Park agreement to provide a right-of way for transit, bike, and pedestrians on the Yosemite Slough bridge because the bridge approach at Candlestick Point would cross the CPSRA. The agreement would also allow for the redevelopment of the Alice Griffith Public Housing site, including 2.43-acres of State Parks–owned land. Compared to the Project, no retail, community service, hotel, or parks and open space uses would be developed. The existing Candlestick Park stadium and parking would remain. Besides the limited State Parks agreement, the CPSRA would remain and retain its existing configuration. All other existing uses at Candlestick Point would remain.

HPS Phase II

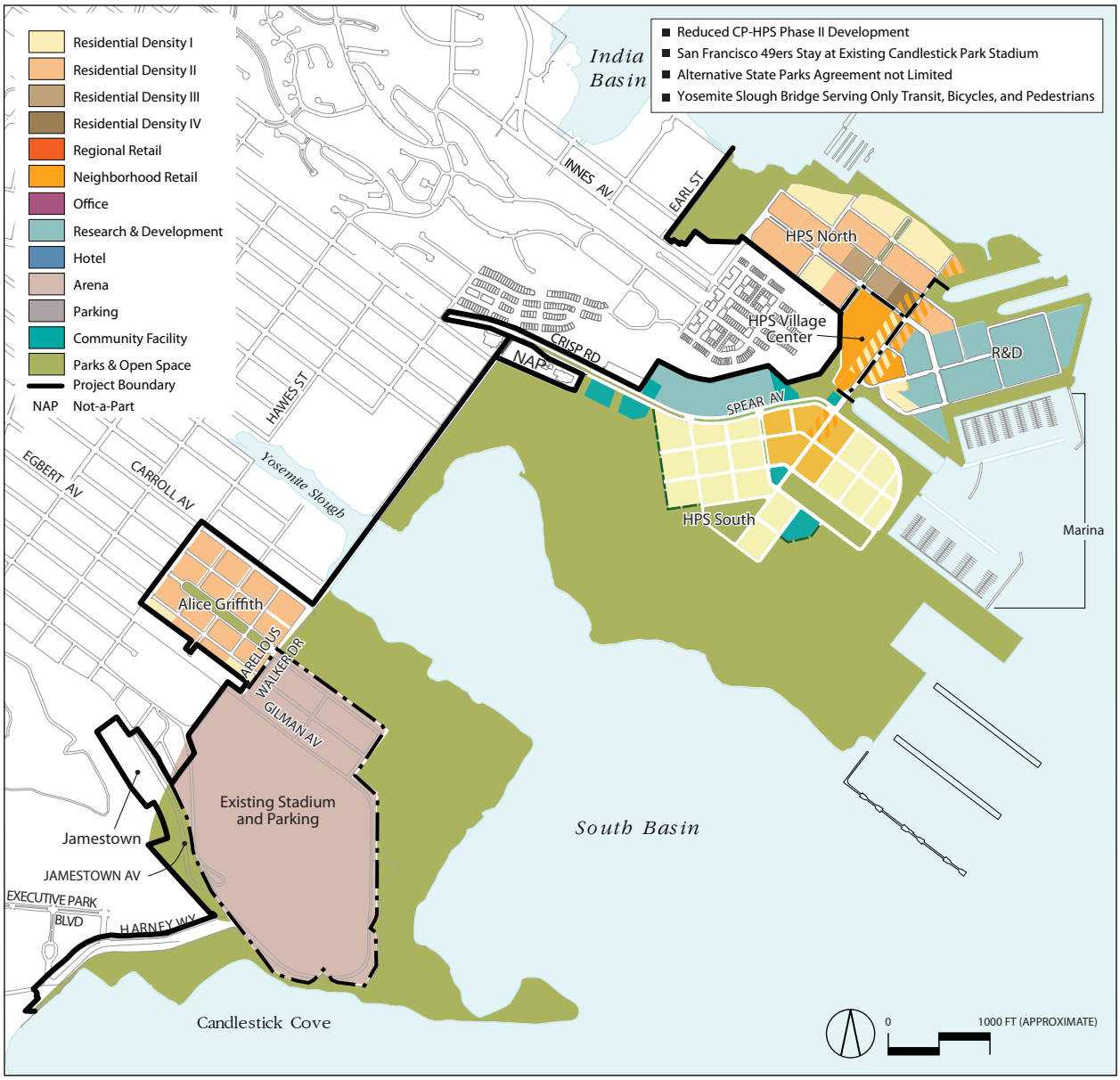
The Alternative 3 land use program at HPS Phase II would include development of 4,000 housing units, 1,350 more units than proposed at the HPS Phase II site with the Project. The additional housing would be in the HPS South district, the site of the proposed stadium under the Project. All other uses would be the same as the Project, including retail, R&D, artists' studios, community services, marina, and parks and open space. Figure VI-2 illustrates the land use plan for Alternative 3.

Table VI-5 Comparison of Alternative 3 and Project Build-Out

Use	*Alternative 3*	*Project*	*Comparison to Project*
Candlestick Point			
Residential (units)	1,210	7,850	-6,640
Retail (gsf):	0		
Regional Retail	0	635,000	-635,000
Neighborhood Retail	0	125,000	-125,000
Community Services	0	50,000	-50,000
Hotel (gsf)	0	150,000	-150,000
Office (gsf)	0	150,000	-150,000
10,000-seat Arena (gsf)	0	75,000	-75,000
Football Stadium (seats)	70,000 (existing)	0	70,000
HPS Phase II			
Residential (units)	4,000	2,650	+1,350
Neighborhood Retail (gross square feet - gsf)	125,000	125,000	0
Research & Development (gsf)	2,500,000	2,500,000	0
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	30,000	30,000	0
Community Services	50,000	50,000	0
Football Stadium (seats)	0	69,000	-69,000
Marina (slips)	300	300	0
Totals			
Residential (units)	5,210	10,500	-5,290
Retail (gsf)	125,000	885,000	-760,000
Community Services	50,000	100,000	-50,000
Research & Development (gsf)	2,500,000	2,500,000	0
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	30,000	30,000	0
Other Elements			
Yosemite Slough bridge	Transit, bike, and pedestrians only	Yes	—
Football stadium (seats)	0	69,000	-69,000
Shoreline Improvements	Yes	Yes	—
State Park Agreement/total acres of State Parkland	Yes/117.2[a]	Yes/96.7	+21.5

SOURCE: Lennar Urban, PBS&J, 2009.

a. Limited exchange of 3.03 acres to construct BRT/pedestrian only Yosemite Slough bridge and Alice Griffith Public Housing



SOURCE: Lennar Urban, 2009.

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FIGURE VI-2 Candlestick Point — Hunters Point Shipyard Phase II EIR

ALTERNATIVE 3 LAND USE PLAN

Transportation and Circulation (with Transit, Bike, and Pedestrian-Only Yosemite Slough Bridge)

A new Yosemite Slough bridge serving transit, bike, and pedestrian traffic only would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. The bridge would be approximately 40 feet wide and would cross the Slough at its narrowest point at the same location as the Project. The bridge and its approach streets would have two dedicated transit lanes and a separate Class I bicycle and pedestrian lane, which would be open at all times.

The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

Basis for Impact Analysis

For the Project, the potential impacts are generally based on the parameters of the Project, which include the size, bulk, and type of development, the footprint of development, and the number of residents, employees, and visitors to the Project site. For Alternative 3, the impacts of the Project are compared to the impacts of a reduced development program. The development program of Alternative 3 would be the same as the development program of the Project, with the following exceptions:

- Construction of 5,210 residential units, which is approximately 50 percent less than the Project
- Construction of 125,000 gsf of neighborhood retail and 50,000 gsf of community services space, which is 50 percent less than the Project
- No construction of regional retail, office, hotel, or arena uses
- Development at Candlestick Point would only include redevelopment of the Alice Griffith Public Housing site and the bridge approach to the Yosemite Slough
- A limited State Parks land agreement that allows for redevelopment of the Alice Griffith Public Housing site and construction of the south approach to the Yosemite Slough bridge
- The San Francisco 49ers stadium at HPS Phase II would not be constructed and the existing Candlestick Park stadium would remain
- Development at the proposed San Francisco 49ers stadium site at HPS Phase II would include residential and retail uses
- Construction of the Yosemite Slough bridge for transit, bicycle, and pedestrian use only (no automobile use)

With a limited State Parks land agreement, there would be a reduced funding mechanism for future maintenance of the parks on site. Additionally, approximately 21 acres of State Parks land would not be transferred for development at Candlestick Point compared to the Project.

Potential Impacts

Land Use and Plans

Implementation of Alternative 3 would require amendments similar to the Project for the following planning documents: *City of San Francisco General Plan*, *Bayview Hunters Point Redevelopment Plan*, *Hunters Point Shipyard Redevelopment Plan, Bay Plan*, *San Francisco Bay Area Seaport Plan*, and *CPSRA General Plan*. However, with implementation of the requirements and mitigation measures identified for the Project in Section III.C through Section III.S of this EIR, development under Alternative 3 would not conflict with any applicable land use plans, policies, or regulations (of an agency with jurisdiction) adopted for the purpose of avoiding or mitigating an environmental effect. Furthermore, development under this Alternative would not conflict with any of the policies, goals, and strategies analyzed for the Project. Similar to the Project, this impact would be less than significant.

Implementation of Alternative 3 would not result in a substantial adverse change in the existing land use character. While Alternative 3 would provide 50 percent fewer residential units than the Project, development under this Alternative would still improve the character of the Alice Griffith Public Housing site and substantially change HPS Phase II from industrial uses to an urbanized area representative of other areas in San Francisco. This change would improve deteriorated conditions and connectivity, as well as provide numerous areas of open space, extensive landscaped areas, pleasing architecture, and shoreline improvements, all of which would improve the character of the site. Furthermore, without construction of the San Francisco 49ers stadium and the continuance of Candlestick Park stadium, changes to the existing land use character would be less than those created by the Project. Therefore, changes resulting from development under Alternative 3 would not be considered adverse changes. Furthermore, the transition in scale between adjacent neighborhoods and development under this Alternative, as well as the varied range of proposed uses at HPS Phase II would not result in a substantial adverse change in the existing land use character of the Project area. Similar to the Project, this impact would be less than significant.

With a limited State Parks land agreement, there would be minimal changes to State Parks land use within the Project site; the agreement only provides enough land to redevelop the Alice Griffith Public Housing site and the south approach to the Yosemite Slough bridge. Approximately 21 acres of State Parks land would not be transferred for development at Candlestick Point compared to the Project. Therefore, there would be minimal impacts to the land use character of State Parks, which would be less than the Project.

Population, Housing, and Employment

Construction activities associated with implementation of Alternative 3 would induce direct job growth at the site. In comparison to the Project, the number of construction workers would be substantially reduced because the development at Candlestick Point would be limited to redevelopment of the Alice Griffith Public Housing site. The limited State Parks land agreement would allow for lesser development than the Project, and the San Francisco 49ers stadium would not be constructed. It is anticipated that construction employees would commute from elsewhere in the region, rather than relocate to the Bayview Hunters Point neighborhood for a temporary construction assignment. Thus, construction of this Alternative would not generate a substantial, unplanned population increase. Impacts associated with construction employment would be less than significant.

Implementation of Alternative 3 would induce direct and indirect population growth, but this growth would not be considered substantial. Compared to the Project, which would develop a total of 10,500 residential units, this Alternative would develop 1,210 residential units at Candlestick Point and 4,000 residential units at HPS Phase II, for a total of 5,210 residential units. Employment growth would result in the demand for approximately 7,620 residential units, which would be greater than the total number of units being provided (approximately 7,005 jobs and 5,210 housing units). It is expected that approximately 55 percent of the workers would seek housing in the City (4,191 units). Based on existing commuting patterns, housing demand in other communities is estimated to be 45 percent of total housing demand (3,429 units).[1353] This would result in a surplus of jobs that could lead to an increased demand for housing units and adverse impacts to the Bayview neighborhood or other areas of the City that would not occur under the Project.

Transportation and Circulation

Alternative 3, with reduced development, residential development would be decreased and retail and arena uses would not be developed at Candlestick Point. At HPS Phase II, housing would be increased; other uses at HPS Phase II would be similar to the Project. The new Yosemite Slough bridge serving only transit, bike, and pedestrian traffic would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. This alternative assumes that the 49ers football team would continue to use the existing Candlestick Park stadium.

The Transportation Study analyzed Alternative 3 and conclusions from the Transportation Study are presented below.

Construction Impacts

- Construction activities associated with Alternative 3 would be similar reduced compared to effects with the Project. Localized construction-related traffic impacts would remain significant and unavoidable.

Intersection LOS

Alternative 3 would have reduced project and cumulative effects at some study intersections. Section III.D discusses traffic effects at those intersections, and the feasibility of mitigation measures. In general, intersection conditions would be significant and unavoidable effects of Alternative 3.

Game day traffic conditions would continue to occur at existing Candlestick Park stadium.

Freeway Conditions

Alternative 3 freeway mainline sections effects, freeway ramp junctions conditions, and ramp queuing effects would generally be similar to the Project conditions. Alternative 3 would have reduced effects at the US-101/Alemany northbound on-ramp (LOS E compared to LOS F with the Project); US-101/Alana/Harney/Geneva southbound on-ramp (LOS C compared to LOS F); US-101/Harney northbound on-ramp Sunday PM (LOS D compared to LOS E); US-101/Bayshore/Chavez northbound

[1353] Total employment was estimated using the employment factors presented in Table III.C-7 of this EIR and a total population of 12,239. Based on existing commuting patterns, housing demand in San Francisco is estimated to be 55 percent of total housing demand housing demand in other communities is estimated to be 45 percent of total housing demand.

on-ramp (LOS D compared to LOS F). Queues on the US-101/Harney northbound off-ramp would not extend onto the mainline segment in Sunday PM conditions. Other freeway impacts with Alternative 3 would be significant and unavoidable.

Transit Impacts

Alternative 3 transit conditions assume implementation of Project-related transit improvements. Alternative 3 would have a less than significant impact on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with Alternative 3 would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. As concluded in Section III.D, the transit delay effects would remain significant and unavoidable. During the AM and PM peak hour, Alternative 3 would require 20 additional vehicles on the same routes as the Project, compared to up to 28 vehicles with the Project.

Bicycle Impacts

The Alternative 3 bicycle trips would be accommodated within the proposed street and network; impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The Alternative 3 pedestrian trips would be accommodated within the proposed sidewalk and pedestrian network; impacts on pedestrian circulation would be less than significant.

Parking Impacts

Alternative 3 would result in a demand for about 10,835 spaces, compared with a maximum permitted supply of about 8,990 spaces; therefore, the maximum off-street parking supply would be about 1,845 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Alternative 3 impacts on parking would be less than significant.

This alternative would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

The construction period and intensity associated with implementation of Alternative 3 would be reduced compared to the Project because the only development at Candlestick Point would be redevelopment of the Alice Griffith Public Housing site and the San Francisco 49ers football stadium would not be

constructed at HPS Phase II. Instead, residential and retail uses would be constructed on the stadium site. Additionally, development under Alternative 3 would result in the construction of 5,210 residential units, which is approximately 50 percent less than the Project. However, construction under Alternative 3 would involve similar types of construction activities compared to the Project. Like the Project, those activities would be visible to surrounding land uses and could impact views of scenic vistas and scenic resources in the area. However, any impacts to views would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. The development area of Alternative 3 is substantially reduced compared to the Project, so temporary impacts on scenic vistas would be reduced compared to the Project. Like the Project, construction activities associated with Alternative 3 would have a less-than-significant impact on scenic vistas.

The Project site contains no scenic resources that would be permanently adversely affected by construction activities. As with the Project, construction activities for Alternative 3 would result in exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates that would be visible during construction of the utility infrastructure improvements. Although these activities would take place primarily on site, views of the activities could be available from surrounding land uses. As with the Project, implementation of the identified mitigation measure (MM AE-2) would require the Project developer of Alternative 3 to screen construction sites from public view at street level, provide for appropriate staging of construction equipment, and maintain the cleanliness of construction equipment. The San Francisco 49ers stadium would not be constructed. Therefore, the potential impacts of construction activities on the visual character or quality of the site would be less than the Project, and less than significant.

The development area of Alternative 3 would be substantially reduced compared to the Project, with the majority of development occurring at HPS Phase II and no construction of the San Francisco 49ers stadium. Residential and retail uses would be constructed on the stadium site instead. Similar to the Project, construction of Alternative 3 would occur during daylight hours, and, therefore, glare could be created as a result of reflection of sunlight off windows of trucks and other construction materials that have the potential to generate glare (i.e., glass); however, similar to the Project, the glare created by construction activities at the Project site would not be substantial enough to affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the Project site, and would not exceed the level of existing night lighting levels in other urban areas of San Francisco. Construction activity under development of Alternative 3 would be less than the Project, therefore, creating less potential for glare impacts. In addition, construction lighting would comply with all City lighting requirements. Therefore, construction activities for development under Alternative 3 would have less-than-significant light and glare impacts, similar to the Project.

Development at HPS Phase II would not substantially block views of scenic vistas, including the Bay. Views of the East Bay and the Bay from HPS Phase II would be maintained on the site and within public access areas, such as from HPS Phase I Hilltop Park. While development of Alternative 3 would include high-rise towers similar to the Project at HPS Phase II, those towers would not substantially obstruct views of the Bay or beyond from any long-range viewpoints. The Yosemite Slough bridge as proposed under the Project would not adversely impact long- or short-range views of the Bay or other scenic vistas. The Yosemite Slough bridge would be constructed with a narrower footprint compared to the Project and would not substantially impact to scenic vistas. Redevelopment of the Alice Griffith Public Housing site

at Candlestick Point would not obstruct scenic vistas because the maximum height of development would be limited to 65 feet. Therefore, similar to the Project, development under Alternative 3 would not substantially obstruct any scenic vistas, and this impact would be less than significant.

Development under Alternative 3 would not substantially damage scenic resources that contribute to a scenic public setting. Scenic resources at HPS Phase II would be retained, including the Re-gunning crane. Shoreline improvements at HPS Phase II would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 3 would not damage or remove any identified scenic resources that contribute to a scenic public setting and the impact would be less than significant.

Development under Alternative 3 would result in fewer changes to the existing visual character of the Project site. In any event, such changes would be the same as for the Project, i.e., conversion of a degraded industrial area and open space to a more developed urban setting, which change would not be considered adverse. Alternative 3 would not substantially degrade the visual character or quality of the Project site area or its surroundings, the same as the Project. In fact, development under Alternative 3 would improve the degraded and deteriorated conditions at the HPS Phase II and Alice Griffith Public Housing sites. Shoreline improvements at HPS Phase II would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 3 would not substantially degrade the visual character or quality of the Project site or its surroundings. The impact would be less than significant, the same as for the Project.

Development under Alternative 3 would increase lighting on the Project site. However, the amount of new lighting would be substantially reduced because none of the Candlestick Point site would be developed with the exception of the Alice Griffith Public Housing. Furthermore, with a limited State Parks land agreement, a smaller portion of State Parks land would be developed; 21 fewer acres than with the Project. The San Francisco 49ers stadium would also not be constructed. Relative to existing outdoor lighting, new building surfaces at the HPS Phase II site and the Alice Griffith Public Housing site would increase the level of illumination in the area. Area lighting would illuminate larger areas that are well traveled so as to promote way finding and provide for a safe environment. In addition to area lighting, building lighting would be angled towards building surfaces for aesthetic purposes and/or to illuminate signs. Like the Project, both types of lighting would be designed to avoid direct visibility of the light source. City Resolution 9212 prohibits the use of highly reflective or mirrored glass in new construction. Implementation of the identified mitigation measures (MM AE-7a.1, MM AE-7a.2, MM AE-7a.3, and MM AE-7a.4) and compliance with City Resolution 9212 would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light, screening vehicle headlights to the maximum extent feasible, and eliminating or minimizing increased glare by the use of non-reflective glass and non-reflective textured surfaces within the proposed development area. Potential stadium lighting impacts would be avoided because the San Francisco 49ers stadium would not be constructed. Therefore, impacts from light and glare would be less than significant, and somewhat less than with the Project.

With a limited State Parks land agreement, there would be a limited established funding mechanism for future maintenance of the State Parks on site from the Project Applicant. Furthermore, as described in Recreation, below, increased use of the CPSRA as a result of population and employment growth associated with Alternative 3 is anticipated. Therefore, increased use of the CPSRA with only a limited

established mechanism for future maintenance of the CPSRA could result in deterioration of the CPSRA. This could potentially result in a substantial adverse impact on the visual character and quality of the Project site. Without a greater funding mechanism to address the increased use, improvements and maintenance of the CPSRA would be the responsibility of CDPR. Therefore, development of Alternative 3 could result in a new adverse impact to the visual character and quality of the CPSRA, unless a funding mechanism is established. This impact would be greater than for the Project.

Shadows

Development under Alternative 3 would include similar heights, layouts, and orientations of buildings as the Project. However, as discussed above, the development program under Alternative 3 would be reduced. A limited State Parks land agreement would only allow for redevelopment of the Alice Griffith Public Housing site at Candlestick Point along with the bridge approach to the Yosemite Slough. New structures in the Alice Griffith Public Housing site would have maximum heights of 65 feet and Gilman Park would experience no new shading. The CPSRA would be affected by new shade in the afternoon from the Alice Griffith Public Housing site, but new shading would be limited and less than the Project. At HPS Phase II, the existing public open space, India Basin Shoreline Park and India Basin Open Space, would not be affected by new shading from development under Alternative 3. Under Alternative 3, a stadium would not be constructed at HPS Phase II. The extent and duration of shadow on new public sidewalks would increase along street corridors of HPS Phase II and the Alice Griffith Public Housing sites. Similar to the Project, this new shadow would not be in excess of that which would be expected in comparable San Francisco neighborhoods. New shade created by implementation of Alternative 3 would occur at limited times of the day and year, and would not substantially affect the use of outdoor recreational facilities or open space. Similar to the Project, this impact would be less than significant.

Wind

Development at HPS Phase II under Alternative 3 would include tower structures above 100 feet in height, which would extend above surrounding buildings and intercept a large volume of wind. Because of the exposure of tall structures to wind, the tower structures proposed under Alternative 3 would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open space areas. The degree of change in pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. Structures nearing or over 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 miles per hour for a single hour of the year would be exceeded. Similar to the Project, the street grid at HPS Phase II would not align with predominant west and west-northwest wind directions and would, therefore, not result in channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potentially significant pedestrian-level wind acceleration at the HPS Phase II site. Development of the Alice Griffith Public Housing site would be limited to 65 feet and would, therefore, not affect pedestrian-level wind conditions.

Implementation of the identified mitigation measure (MM W-1a) for development at HPS Phase II would reduce the potential impact from wind for development of Alternative 3 by requiring review of all buildings with potential significant adverse wind impacts by a qualified wind consultant. The *Planning Code* requires that for any such exceedances of the wind hazard criteria would require revised design to reduce the impact below

the established threshold. Implementation of required design changes, if any, would reduce potential hazardous wind effects at the pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas. Compliance with the mitigation measures would ensure pedestrian safety in pedestrian-access areas. Similar to the Project, through implementation of the identified mitigation measure, wind impacts at the HPS Phase II and Alice Griffith sites would be less than significant.

Air Quality

The footprint of development, the total amount of development, and the land uses provided with Alternative 3 would be reduced compared to the Project, Alternative 3 involves limited development at Candlestick Point, and considerably less development would occur at HPS Phase II. No new stadium would be constructed, and the State Parks agreement would not occur. As development would be considerably less than under the Project, the potential air quality impacts would less than the Project.

Construction activities for Alternative 3 would generate dust; however, they would need to comply with the San Francisco Health Code and BAAQMD requirements. Implementation of MM HZ-15, which would require the Applicant to ensure that construction contractors comply with the dust control strategies included in an approved dust control plan as part of a site-specific dust control plan, would reduce the impacts caused by construction dust to a less-than-significant level.

Construction activities could also create DPM; however, as the development of Alternative 3 would be considerably smaller than under the Project, implementation of MM AQ-2.1 and MM AQ-2.2, accelerated emission control implementation on construction equipment, would keep this impact less than significant. Construction activities could also generate TAC containing PM_{10}; however, as construction activities for Alternative 3 would be fewer than for the Project, this impact would be less than significant.

Though operational emissions associated with Alternative 3 would be much lower than with the Project, due to the smaller scale of Alternative 3, the mass emissions would exceed the BAAQMD CEQA thresholds and therefore this impact would remain significant and unavoidable, similar to the Project. Alternative 3 has the same R&D square footage as the Project, therefore potential TAC emissions from facilities in R&D areas would be similar to the Project. With the implementation of MM AQ-6.1 and MM AQ-6.2, this impact would be less than significant, same as the Project.

Additionally, as the scale of Alternative 3 is smaller than the Project, the impacts from Alternative 3 traffic (e.g., carbon monoxide and $PM_{2.5}$) would be less than the Project and less than significant.

According to the current BAAQMD CEQA Guidelines, odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that the BAAQMD regards with potential to generate considerable odors include: wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, oil refineries and chemical plants. Alternative 3 would be a large mixed-use development containing residential, office, retail, R&D, recreational, and entertainment uses. Although there may be some potential for small-scale, localized odor issues to emerge around proposed sources such as solid waste collection, food preparation, etc., substantial odor sources and consequent effects on on-site and off-site sensitive receptors would be unlikely and would be resolved by interventions after receipt of any complaints. This would be a less-than-significant impact, the same as for the Project.

The Project is consistent with regional air quality plans; therefore, as Alternative 3 is smaller than the Project, it would remain consistent with these plans. Alternative 3 promotes the use of alternative transportation modes, such as transit, biking and walking. In addition, it puts housing in close proximity with jobs and retail establishments, reducing the length of trips and further reducing reliance on single-occupancy vehicles. Therefore, Alternative 3 conforms to the regional air quality plan and there would be a less-than-significant impact, the same as for the Project.

Noise

As the footprint of development, the total amount of development, and the land uses provided with Alternative 3 would be reduced compared to the Project, noise impacts of Alternative 4 would be the less than the Project.

Construction activities for Alternative 3 would expose sensitive receptors to increased noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which generally prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction Best Management Practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels, similar to the Project.

Construction activities for Alternative 3 would result in a temporary or periodic increase in ambient noise levels that would be noticeable and likely cause for human annoyance. Construction activities would occur within 25 feet of existing and future residential uses. Pile driving activities could result in substantial noise levels of up to 107 dBA at new residential uses on the site or at adjacent existing residences. Construction-related temporary increases in ambient noise levels would be considered significant and unavoidable, the same as for the Project.

Construction activities for Alternative 3 would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction Best Management Practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction Best Management Practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under Alternative 3, but not to a less-than-significant level as vibration levels from pile driving activities

would be similar to the Project for the residential uses within the HPS North District; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of Alternative 3, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with Alternative 3, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of Alternative 3 would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Although considerably less development would occur under Alternative 3, significant impacts identified for the Project along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, would remain with implementation of Alternative 3. Because the Alternative 3 would not include a football stadium at HPS Phase II and the stadium at Candlestick Point, noise impacts identified for the Project from football games and concerts would not occur with implementation of Alternative 3. Noise generated from the existing stadium is considered an existing condition and would not be considered an impact of the Project.

The Project site is not located within an airport land use plan area or near a private airstrip. Furthermore, Alternative 3 does not include an aviation component. Therefore, Alternative 3 would not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources

Alternative 3 would not change the significance of any historic structures at Candlestick Point because no historic resources have been identified at Candlestick Point. Similar to the Project, implementation of Alternative 3 would retain Drydocks 2 and 3 and rehabilitate Buildings 140, 204, 205, and 207 at the HPS Phase II site in accordance with the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. However, development under Alternative 3 would result in the demolition of Buildings 211, 231, and 253, which are historic resources in the expansion of the Hunters Point Commercial Dry Dock and Naval Shipyard Historic District to include Drydock 4 and contributing buildings. This would result in a significant impact because the proposed actions would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of the identified mitigation measures (MM CP-1b.1 and MM CP-1b.2) would reduce those impacts; however, the demolition of historic resources would not reduce impacts to a less-than-significant level. Therefore, similar to the Project, the impacts to these historical resources, created by developing Alternative 3, would be a significant and unavoidable.

Construction activities associated with Alternative 3 within the Alice Griffith Public Housing site and HPS Phase II site could result in a substantial adverse change in the significance of archaeological resources. The Project site overall is likely to contain subsurface archaeological resources from the Native American, Chinese fishing village, prehistoric, and maritime development periods. Similar to the Project, construction activities associated with Alternative 3 could disturb those archaeological resources, and result in potentially significant impacts. Implementation of the identified mitigation measure (MM CP-2a) would reduce the effects on archaeological resources to a less-than-significant level.

Construction activities associated with Alternative 3 could result in a substantial adverse change in the significance of paleontological resources. Compared to the Project, these potential impacts would be limited to the HPS Phase II and Alice Griffith Public Housing sites. Under Alternative 3, the development footprint at Candlestick Point would be substantially smaller than the Project and the development footprint at HPS Phase II would be greater than the Project. The Bay mud underlying portions of the fill is likely to contain paleontological resources. Similar to the Project, implementation of the identified mitigation measure (MM CP-3a) would reduce the effects of construction-related activities to potential paleontological resources in in-water and off-site areas to a less-than-significant level for development under Alternative 3.

Hazards and Hazardous Materials

Under Alternative 3, the construction impacts associated with Hazards and Hazardous Materials would be reduced as compared to the Project because the overall development footprint would be smaller. There would be no new development on Candlestick Point, and the new stadium would not be constructed. The Yosemite Slough bridge would have a smaller footprint than with the Project, as it would be designed to accommodate BRT, bicycles, and pedestrians only. This reduced development would result in a smaller area subject to disturbance.

Site preparation would include deep excavations for large structures such as for residential towers, with plans to use the cut material elsewhere within the Project site as fill, trenching for utility lines, dewatering, grading and compaction and other earth-disturbing activities. As portions of the site are known to contain elevated levels of chemicals in the soil, construction activities could result in exposure of construction workers, the public or the environment to unacceptable levels of hazardous materials if not handled appropriately. MM HZ-1a would reduce effects related to exposure of known contaminants at Alice Griffith by requiring compliance with Article 22A or an equivalent process. At HPS Phase II, potential effects related to exposure to hazardous materials from construction activities would be mitigated through requirements to comply with restrictions imposed on the property through the federal site clean-up process (MM HZ-1b, MM HZ-9, and MM HZ-12). Disturbance of contaminated soil would be reduced with elimination of the Yosemite Slough bridge and new stadium, but would still occur. MM HZ-10b would ensure approval of workplans by the Navy and regulatory agencies prior to any work in the shoreline areas. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts from disturbance of contaminated soil, groundwater and sediments.

At both Candlestick Point and HPS Phase II, compliance with MM HZ-2a.1 would require the preparation and implementation of contingency plans to address unknown contaminants that might be encountered during construction, and compliance with MM HZ-2a.2 would require preparation and implementation of health and safety plans to protect construction workers from exposure to hazardous materials during construction activities. Construction activities could require off-site transport of contaminated soil or groundwater; compliance with federal, state, and local regulations would ensure that no unacceptable exposure to chemicals occur as a result of these activities. Further, mitigation measures MM HY-1a.1, MM HY-1a.2, and MM HY-1a.3 would ensure that no unacceptable levels of hazardous materials in soil in surface runoff or in groundwater are discharged to the sewer system or discharged from the site to the Bay. Hazardous materials impacts from all of the above construction-related activities would be reduced to less than significant with the implementation of the mitigation measures identified above, the same as for the Project.

Development under Alternative 3, as for the Project, would require the installation of foundation support piles, which could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to migrate to the deeper groundwater aquifer. However, MM HZ-5a, which requires preparation of a plan for pilot boreholes for each pile to prevent disturbance of potentially contaminated fill materials and would reduce this potential impact from pile driving to less than significant, the same as for the Project.

Elimination of construction of the Yosemite Slough bridge would avoid impacts associated with disturbance of potentially radiologically impacted soils at HPS Phase II in the vicinity of Parcels E and E-2, thus reducing the potential for exposure to hazardous materials in soil or groundwater in this area.

Alternative 3 would place housing on the HPS Phase II site. The Navy's cleanup plan is designed to remediate the HPS site to levels acceptable for the planned uses in the existing HPS Redevelopment Plan. To the extent that Alternative 3 proposes to place housing in areas not designated for residential use in the existing HPS Redevelopment Plan, additional hazardous materials remedial work could be required, which could result in some increased risk to workers, the public and environment from exposure to hazardous materials during the construction process. Any property that has not been remediated for unrestricted use at the time of transfer will have use restrictions placed on the property in compliance with the federal clean-up process. For use restrictions to be removed, the Project Applicant would be required by the transfer documents to obtain approval from the regulatory agencies overseeing the clean-up process before residential uses could be placed on these portions of the site. Any remedial activities undertaken as part of the construction process would be subject to the requirements in MM HZ-1b, which requires construction activities at HPS Phase II to be done in accordance with all restrictions imposed on the site by the federal regulatory clean-up process and these impacts would be less than significant, the same as for the Project.

Potential impacts associated with disturbance of naturally occurring asbestos would be similar to those associated with the Project and would be mitigated through MM HZ-15, which requires the preparation of dust control plans as required by BAAQMD and DPH. Alternative 3 would involve the demolition of existing structures that may contain asbestos-containing building materials, lead-based paint and other hazardous materials, the same as the Project. The existing regulatory framework and approval process would avoid potential hazards from demolition or building preservation activities and impacts would be less than significant, the same as the Project.

Alternative 3 would involve off-site roadway improvements, which could result in disturbance of hazardous material in soil or groundwater. Unacceptable exposures would be controlled as for the Project by implementation of MM HZ-1a, and hazardous materials impacts from these activities would be less than significant.

Project operations would involve routine use, storage, transport, or disposal of hazardous materials. The use of such materials would be the same as for the Project, as the development program is essentially the same. Compliance with applicable federal, state, and local regulations related to the use, storage and transport of such materials would result in a less-than-significant impact from hazardous materials usage, the same as for the Project.

Geology and Soils

Compared to the Project, potential construction-related geology and soils impacts of Alternative 3 would occur as a result of construction activities at the HPS Phase II, Alice Griffith Public Housing, and Yosemite Slough bridge sites. Under Alternative 3, the development footprint at Candlestick Point would be substantially smaller than the Project (limited to only the Alice Griffith Public Housing site and the Yosemite Slough bridge approaches) and the development footprint at HPS Phase II would be greater than the Project. Additionally, because the State Parks land agreement would be limited, less land would be available for development under Alternative 3. The San Francisco 49ers stadium would also not be built under the Alternative.

Construction activities, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. This includes construction of the Yosemite Slough bridge. However, requirements to control surface soil erosion during and after construction of Alternative 3 would be implemented through the requirements of the identified mitigation measure (MM HY-1a.1), and adverse effects on the soil such as soil loss from wind erosion and stormwater runoff would be reduced to a less-than-significant level, the same as for the Project

Construction activities would have the potential to affect groundwater levels. Construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. The dewatering could cause settlement of adjacent soils that could damage the overlying foundations of existing buildings. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by the identified mitigation measure (MM GE-2a), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Similar to the Project, settlement hazards related to dewatering would be less than significant for development under Alternative 3.

Development of Alternative 3 would require rock removal activities at the Alice Griffith Public Housing site that could result in damage to structures from vibration or settlement caused by the fracturing of bedrock for excavation. Compared to the Project, Alternative 3 would not require rock removal at the Jamestown district because that area would not be developed. With implementation of the identified mitigation measure (MM GE-3), vibration from controlled rock fragmentation in the area would not cause unacceptable settlement at adjacent or nearby properties. Similar to the Project, settlement hazards related to controlled rock fragmentation would be less than significant for development under Alternative 3.

The potential for exposure to adverse effects caused by seismic groundshaking and seismically induced ground failure such as liquefaction, lateral spreading, landslides and settlement exists at the Project site. The identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, MM GE-5a, and MM GE-6a) would require design-level geotechnical investigations for development under Alternative 3. Design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of structures, as required by the SFBC through review by DBI. The structural design review would ensure that all necessary mitigation methods and techniques are incorporated in the design for foundations and structures to reduce potential impacts from ground failure or liquefaction to a less-than-significant level for development under Alternative 3, the same as for the Project.

The existing shoreline exhibits active erosion and consists of areas of unprotected slopes and dilapidated naval pier and wharf structures. At HPS Phase II, Alternative 3 would include numerous shoreline improvements, including additional concrete revetments, creation of new beach and tidal habitat, and some grading and importation of fill at certain locations. These improvements would improve the stability of the shoreline. Therefore, Alternative 3 would not result in the exposure of structures and facilities at the HPS Phase II site to substantial adverse effects caused by shoreline instability. Similar to the Project, the impact would be less than significant.

The potential for adverse effects caused by landslides, settlement, expansive and corrosive soils, exists at the HPS Phase II, Alice Griffith Public Housing site, and the Yosemite Slough bridge. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual elements of development for Alternative 3, as specified in the identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, MM GE-5a, MM GE-6a, MM GE-10a, MM GE-11a) for the Project. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of those mitigation measures, impacts with regards to landslides, settlement, and expansive and corrosive soils would be less than significant. Impacts associated with construction of the stadium would be avoided because the stadium would not be constructed under Alternative 3.

Hydrology and Water Quality

The footprint and amount of development for Alternative 3 would be considerably reduced compared to the Project, because a limited State Parks agreement would occur, the Candlestick Park Stadium would remain, development at Candlestick Point would be limited to the redevelopment of the Alice Griffith Public Housing site and the construction of a reduced number of housing units, and a new stadium at HPS Phase II would not be constructed. The extent of impervious surfaces would also be reduced as less development would occur. As such, impacts from construction and operation of the Alternative 3 would be less than the Project.

With adherence to applicable regulatory requirements, construction activities associated with Alternative 3 would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With reduced overall development, impacts would be less than the Project, however mitigation measures proposed under the Project would be still be applicable. With implementation of mitigation measures MM HY-1a.1 (preparation of a Storm Water Pollution Prevention Plan—SWPPP—for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

Construction activities associated with Alternative 3 would include excavation for building foundations and underground utilities which could require short-term and/or long-term dewatering of the affected areas. As no extensive underground space is proposed for Alternative 3, the installation of underground building elements and utilities would not substantially alter groundwater levels, similar to the Project. As such, Alternative 3 would not substantially deplete groundwater supplies and would result in a less than

significant impact, similar to the Project. As the total amount of open space under Alternative 3 is reduced compared to the Project, the amount of permeable surface within the Project footprint would also be less. However, a limited State Parks agreement would occur, and existing open space accounted for under the Project would remain. Therefore, Alternative 3 would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within Alternative 3 site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of Alternative 3, the existing drainage patterns within the area would generally be preserved. Construction activities associated with Alternative 3 would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated with Alternative 3, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of an SWPPP) impacts would be less than significant, similar to the Project.

Operation of Alternative 3 would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of Alternative 3. In addition, Alternative 3 would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the extent of impervious surfaces for Alternative 3 would be reduced than the Project, impacts would be less than the Project.

Development under Alternative 3 would also not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of Alternative 3 could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on or off site similar to the project. Implementation of Alternative 3 would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of Alternative 3 would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of Alternative 3 would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, Alternative 3 would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

Compared to the Project, potential construction-related biological resource impacts of Alternative 3 would occur as a result of construction activities at the HPS Phase II, Alice Griffith Public Housing, and Yosemite Slough bridge sites. Under Alternative 3, the development footprint at Candlestick Point would be substantially smaller than the Project (limited to only the Alice Griffith Public Housing site and the Yosemite Slough bridge approaches) and the development footprint at HPS Phase II would be greater than the Project. Additionally, because the State Parks land agreement would be limited, less land would be available for development under Alternative 3. The San Francisco 49ers stadium would also not be built under the Alternative.

Alternative 3 would involve removal and/or modification of areas that have the potential to contain special-status species, including: seven potentially breeding avian species, one bat species, and four fish species (green sturgeon, Chinook, steelhead, and longfin smelt). Alternative 3 would also have the potential to affect designated critical habitat of the green sturgeon and Central California Coast steelhead and thus, directly impact threatened and/or endangered species through habitat conversion or unauthorized take. In addition, activities would occur within habitats of locally rare or sensitive species such as Pacific herring and Olympia oysters, as well as avian species protected by the MBTA. Where applicable at the HPS Phase II and the Alice Griffith Public Housing sites, Alternative 3 would include implementation of the ecological design features described in the Project's Draft Parks, Open Space, and Habitat Concept Plan that would result in multiple measures to avoid, limit, and mitigate for impacts to special-status and legally protected species. Specifically, the design components would remove invasive species; restore, preserve,

and enhance wetland, aquatic, and grassland habitats; revegetate the site with extensive planting of trees and shrubs; increase the vegetative cover for foraging and dispersing animals; and maintain and enhance habitat connectivity along the shoreline. Alternative 3, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-6a.1, MM BI-6a.2, MM BI-6b, MM BI-7b, MM BI-9b, MM BI-18b.1, and MM BI-18b.2) and ecological design features, would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Similar to the Project, this impact would be less than significant after mitigation. However, impacts to such species would be less than the Project since there would be less removal and/or modification of areas that have the potential to contain special-status species.

Development of Alternative 3 could have a substantial adverse effect on sensitive natural communities identified in local or regional plans, policies, and regulations, or by the CDFG or USFWS. The only sensitive habitats other than wetlands and aquatic habitats are eelgrass and areas designated as EFH. Shoreline improvements, shoreline abutments for the proposed marina and installation of the breakwater at HPS Phase II could have substantial adverse impact to the communities. However, with implementation of the identified mitigation measures (MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12b.1, MM BI-12b.2, MM BI-12b.3, MM BI-18b.1, MM BI-18b.2, MM BI-19b.1, and MM BI-19b.2), the potential impacts of Alternative 3 on sensitive natural communities identified in local or regional plans, policies, and regulations, or by the CDFG, NMFS, or USFWS, would be reduced to a less-than-significant level. Potential impacts to eelgrass beds would be the same as the Project (eelgrass beds are not located near Yosemite Slough), while impacts to EFH would be less than the Project since the footprint of Yosemite Slough bridge would be reduced and, thus, potential impacts to EFH would also be reduced.

Development of the Yosemite Slough bridge under Alternative 3 would have a smaller footprint compared to the Project because the width of the bridge would be narrower, due to automobiles not using the bridge. Therefore, the temporary and permanent adverse effects of Alternative 3 on wetlands and federally protected waters would be reduced compared to the Project. However, as with the Project, Alternative 3 would implement compensatory mitigation for wetland loss. The shoreline improvements at HPS Phase II included Alternative 3 would be similar to the Project and could have substantial temporary and permanent adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. The identified mitigation measures (MM BI-4a.1 and MM BI-4a.2) would reduce the effects of construction-related activities to wetlands and other waters by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation, preservation, and/or restoration), obtaining permits from the USACE, SFRWQCB, and BCDC that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. With implementation of the identified mitigation measures, the impacts of development under Alternative 3 to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, and somewhat less than the Project because of reduced development.

Development of Alternative 3 could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. The Project site is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways occur within the Project site. Implementation of Alternative 3 would place new residential towers along a portion of the San Francisco Bay shoreline at HPS Phase II. Compared to the Project, the amount of towers would be substantially reduced and the strike hazard related to the stadium light towers would be avoided because the stadium would not be constructed. However, the towers at HPS Phase II could potentially increase strike hazards and alter flight paths, interfering with migratory avian flight paths, which would be considered a potentially significant impact to migratory birds. With respect to aquatic species, although migratory fish could continue to move though the open water and Yosemite Slough, the Project site does not contain any substantial migratory fish pathways such as anadromous fish streams. However, construction of breakwaters and other shoreline treatments in HPS Phase II would occur near eelgrass beds, which could directly or indirectly impact eelgrass beds such that productivity and survival of these habitats would be substantially reduced. Similar to the Project, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-20a.1, and MM BI-20a.2), the potential, impacts of Alternative 3 would be reduced to a less-than-significant level because it would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Similar to the Project, Alternative 3 would be required to comply with mitigation measure MM BI-14a to ensure that Project development would not result in conflicts with the City's tree protection ordinances. With implementation of MM BI-14a, Alternative 3 would not conflict with any local policies or ordinances protecting biological resources and impacts would be less than significant, similar to the Project.

Public Services

Police Protection

During construction of Alternative 3, emergency access to the Project site would be maintained through compliance with the CTMP, as required by mitigation measure MM TR-1. The purpose of a CTMP is to ensure that the impacts of construction on the public domain, in particular with respect to temporary interruptions to vehicular and pedestrian traffic, are considered and addressed. Because Alternative 2 would include the same mitigation as the Project, there would be a similar requirement to prepare a CTMP for Alternative 3 that would address temporary impacts on circulation during construction. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. Construction activities associated with implementation of Alternative 3 also could increase demand for SFPD services if the site is not adequately secured, providing increased opportunity for criminal activity. To ensure adequate site security, mitigation measure MM PS-1 would require the Project Applicant to provide security during construction. Therefore, this impact would be less than significant, the same as for the Project.

Implementation of Alternative 3 would increase resident and employee population at the Project site resulting in a potential increase in the need for 29 additional police personnel to provide a comparable level of service to existing conditions.[1354] This is 24 fewer additional police officers than the Project would require. The SFPD evaluates the need for additional officers by sector, and not station or district needs. While it is unlikely that 29 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development of Alternative 3.

If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 sf could be constructed within the HPS Phase II site, on land designated for community-serving uses. As part of the this Alternative, up to 50,000 gsf of land at the HPS Phase II site would be designated for community-serving uses including a police station. [1355] Construction of a new SFPD facility (counter, storefront, or other configuration) within these community services uses and/or the reconfiguration or expansion of the existing Bayview Station would be funded by the Project Applicant. Similar to the Project, Alternative 3 includes community service use areas, and as construction would be funded by the Project Applicant, the SFPD would maintain acceptable levels of police service. With less overall development under Alternative 3, in comparison to the Project, the potential need for police protection services in general would also be less under Alternative 3. Furthermore, the stadium would also not be constructed under Alternative 3, eliminating the need for increased police services on game days. Therefore, development of this Alternative would not require new or physically altered police facilities beyond the scope of the Project in order to maintain acceptable police services. This impact is considered less than significant, the same as for the Project.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Fire and Emergency Medical Services

Alternative 3 would add 5,210 residential units and substantially increase employment-generating uses, resulting in an employment population of 7,005. The increase in the residential and daytime employment population (for a total population of 19,144, including residential population of 12,139 plus 7,005 employees), combined with an increase in the intensity of physical development on the Project site, would result in new demand for fire protection and emergency medical services, although somewhat less compared to the Project because of the alternative's smaller development.

During construction of Alternative 3, emergency access to the Project site would be maintained through compliance with the CTMP, as required by mitigation measure MM TR-1. Construction of a new SFFD facility on land designated for community-serving uses on the HPS Phase II site (where costs would be borne by the Project Applicant) would allow the SFFD to maintain acceptable response times for fire

[1354] The number of required police officers need to meet comparable level of service to existing conditions was determined using the total daytime population of Alternative 3 (residential population of 12,139 plus 7,005 employees) and the ratio of officers to population presented in Table II.O-2 (1:665 officer to population).
[1355] A total of 50,000 gsf of community services space would be developed under Alternative 3 compared to 100,000 gsf proposed under the Project.

protection and emergency medical services. However, with less overall development under Alternative 3, in comparison to the Project, the potential need for fire and emergency medical services in general would also be less under Alternative 3. Furthermore, the stadium would also not be constructed under Alternative 3, eliminating the need for increased fire and emergency medical services on game days. Similar to the Project, construction of 50,000 gsf of community facilities at HPS Phase II, which could include a new SFFD facility, would be included as a component of Alternative 3.[1356] Therefore, development under Alternative 3 would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is considered less than significant.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Schools

A total of approximately 1,058 school-age children would live within the Project site following full build-out of Alternative 3.[1357] Compared to the Project the amount of school-age children that would live within the Project site following full build-out of Alternative 3 would be substantially reduced. While schools in the Project vicinity have approximately 49 percent capacity remaining in the 2008-2009 school year, it is likely that a 12 percent overcapacity of SFUSD as a result of citywide population growth in 2030 would occur. Similar to the Project, the payment of school impact fees pursuant to SB50 would constitute full mitigation for any potential schools impacts. This impact is considered less than significant for development under Alternative 3, the same as for the Project.

Libraries

Construction of Alternative 3 would not result in impacts to the SFPL. No library branches are located on the Project site. All library services would be available to the community throughout the duration of construction. As such, no impact to library services during construction of Alternative 3 would occur.

Residential and nonresidential development associated with Alternative 3 would increase demand for local library services in the Bayview neighborhood, although due to a 50 percent reduction in residential units, this demand for local library services would be less than under the Project. Although this Alternative would result in a direct and indirect population increase within the Bayview neighborhood, library branches serving the Project site, including the Portola, Visitacion Valley, and the Bayview branches would continue to meet the demands of the community. In addition to the three library branches serving Alternative 3, space would be included at HPS Phase II that would be dedicated to library services to supplement the Bayview branch library. As part of Alternative 3, a 1,500-gsf reading room and automated book-lending machines would be integrated into the community retail and public facilities uses. The SFPL branches, and the dedication of space to accommodate library services on the Project site in order to supplement SFPL

[1356] A total of 50,000 gsf of community services space would be developed under Alternative 3 compared to 100,000 gsf proposed under the Project.
[1357] For Alternative 3, 5,210 residential units multiplied by 0.203 SFUSD student generation rate would result in 1,058 students.

branches, would accommodate increased demand from development under this Alternative. No additional library facilities would be required to accommodate development of Alternative 3. Therefore, no new or physically altered library facilities would be required in order to maintain acceptable service ratios and this impact is considered less than significant for development under Alternative 3.

Recreation

Implementation of Alternative 3 would include parks and open space areas similar to the Project at HPS Phase II and within the Alice Griffith district. Alternative 3 would include a limited State Parks land agreement. The agreement would also allow for the redevelopment of the Alice Griffith Public Housing site, including 2.43-acres of State Parks–owned land. Construction activities associated with the proposed parks and recreational facilities are considered part of the overall development footprint. Parks, open space, and recreational facilities at HPS Phase II would consist of approximately 251 acres. The 1.4-acre Alice Griffith Neighborhood Park would also be constructed under this Alternative. In addition, because the State Parks land agreement would be limited to allow the Yosemite Slough bridge to cross CPSRA lands, no CPSRA acreage would be improved. Therefore, construction activities at Candlestick Point would be substantially reduced compared to the Project. Similar to the Project, construction impacts associated with development of new parks and recreational facilities would be less than significant.

At build-out of Alternative 3, the projected population within the HPS Phase II and Alice Griffith Public Housing sites would increase to approximately 12,139 residents, while employment would increase to approximately 7,005 jobs. Compared to the Project, the State Park agreement would not occur so the existing 120.2 acres would remain in the CPSRA, compared to the 23.5-acre reduction under the Project. The increase in population and employment could result in an increase in the use of existing parks, recreational facilities, and open space. During a given phase, however, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual, and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed. Parks and open space at HPS Phase II would include improvements similar to the Project and would help offset the increase in demand created by new residents and employees. The 1.4-acre Alice Griffith Neighborhood Park would serve residents of the Alice Griffith Public Housing site.

With a limited State Parks land agreement, there would be a limited established funding mechanism for future maintenance of the State Parks on site from the Project Applicant. Furthermore, increased use of the CPSRA as a result of population and employment growth associated with Alternative 3 is anticipated. Therefore, increased use of the CPSRA with only a limited established mechanism for future maintenance of the CPSRA could result in deterioration of the CPSRA. This could potentially result in a substantial adverse impact on recreational facilities at the Project site. Without a greater funding mechanism to address the increased use, improvements and maintenance of the CPSRA would be the responsibility of CDPR. Therefore, development of Alternative 3 could result in a new adverse impact on recreational facilities, greater than the less-than-significant impact under the Project.

A windsurfing launch site is located in the CPSRA. Windsurfing could potentially be impacted by the construction of tall structures at Candlestick Point in close proximity to the Bay that affect wind patterns

and direction. Alternative 3 would not include development of any towers at Candlestick Point and windsurfing conditions would not be affected.

Utilities

Water Supply

Alternative 3 would include water infrastructure similar to the Project. Impacts of construction activities associated with this infrastructure, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of water conveyance or treatment infrastructure associated with the Project. The water required for construction activities is assumed to be supplied by water trucks and/or existing sources. No construction-related impacts associated with the consumption of water would occur with the Alternative 3.

Alternative 3 would include less residential and non-residential development compared to the Project. Development at Candlestick Point would only include redevelopment of the Alice Griffith Public Housing site. Alternative 3 would generate a total demand of approximately 0.97 mgd, 0.7 mgd less than the Project. As current water use from existing land uses at the Project site is approximately 0.3 mgd, the net effect of the Alternative 3 on water demand would be an increase of approximately 0.67 mgd.[1358] As stated in the Water Supply Assessment provided for the Project, the SFPUC projects that adequate supply would be available to satisfy all retail demand, including Project-related demand, under normal conditions (refer to Appendix Q1). Therefore, there would be sufficient water supplies to accommodate the water demand of Alternative 3. This is considered to be a less-than-significant impact. Similar to the Project, implementation of Alternative 3 would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant.

Implementation of Alternative 3 would require expansion of the existing off-site AWSS by providing an AWSS loop at Candlestick Point that would connect to the planned extension of the existing off-site AWSS on Gilman Street from Ingalls Street to Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road. Implementation of the identified mitigation measure (MM UT-2) would ensure the provision of adequate water for on-site fire-fighting purposes, and the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements for water to fight fires. The impact is less than significant with implementation of this mitigation measure.

Wastewater

Under Alternative 3, the Alice Griffith Public Housing site would discharge a maximum peak flow of 186 gpm to the Candlestick tunnel sewer, which has an existing unused capacity of 28,035 gpm in dry weather. This flow would combine with a maximum peak flow of 858 gpm from the HPS Phase II into the Hunters

[1358] Water demand for this alternative was estimated by prorating water demand for the Project (presented in Table III.Q-4) based on build-out of Alternative 3.

Point tunnel sewer. The total maximum peak Project flows of 1,044 gpm (1,414 gpm less than the maximum peak flow of the Project) would combine in the Hunters Point tunnel sewer, which has an existing unused capacity of 69,853 gpm in dry weather.[1359] This represents 1.5 percent of the available capacity of the Hunters Point tunnel sewer, which could be accommodated by the existing off-site infrastructure.

The wastewater generated under Alternative 3 would be 1,414 gpm less than the maximum peak flow of the Project. As with the Project, it is possible that a temporary increase in CSO volume could occur during wet weather if structures are occupied and contribute wastewater to the Combined Sewer System prior to completion of the separate stormwater and wastewater infrastructure of Alternative 3. Implementation of the identified mitigation measure (MM UT-3a) would ensure that there would be no increase in CSO flows as a result of this alternative by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems. The impact on the Combined Sewer System would be reduced to less than significant.

The maximum peak flow of wastewater generated under Alternative 3 would be 1,414 gpm less than the maximum peak flow of the Project. The current remaining treatment capacity of the SWPCP would accommodate the increase in wastewater flows from the development of Alternative 3. Overall flows during wet weather would decrease, indicating that the proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows, assuming completion of utility infrastructure prior to occupancy of Alternative 3. Based on this analysis, the overall volumes in the Bayside system during wet weather would be less than under existing conditions with implementation of the Alternative 3. It is possible that a temporary increase in CSO volume could occur (which could affect the capacity of the SWPCP for treatment) during wet weather, as noted, above. Implementation of the identified mitigation measure (MM UT-3a) would reduce this impact to less than significant by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Alternative 3. Thus, Alternative 3 would not result in any net increase in CSO volume in the Bayside system during wet weather. A less-than-significant impact to existing off-site treatment facilities would occur.

Development associated with Alternative 3 would incrementally contribute wastewater during dry and wet-weather events to the Combined Sewer System operated by the SFPUC, but overall, wet-weather volumes would decrease in the Bayside system with construction of the alternative's separate stormwater and wastewater systems. In addition, the maximum peak flow of wastewater generated under Alternative 3 would be 1,414 gpm less than the maximum peak flow of the Project. Compliance with any applicable permit requirements, as monitored and enforced by the SFPUC, would ensure that the Alternative 3 would not exceed the applicable wastewater treatment requirements of the RWQCB. In addition, Alternative 3 would not cause the City to exceed the requirements of the NPDES permit for the reasons previously stated and because the flows during wet weather would actually decline compared to existing flows from the Project site. This impact would be less than significant.

[1359] Wastewater generation for this alternative was estimated by using the generation rates presented in Table III.Q-5 based on build-out of Alternative 3.

Solid Waste

Demolition of existing facilities within the Project site under Alternative 3 would be substantially less than the Project because the only construction and demolition activity at Candlestick Point would occur at the Alice Griffith Public Housing site and the approach to the Yosemite Slough bridge. Candlestick Park stadium would not be demolished. Similar to the Project, some construction and demolition debris would be reused on site, while other materials would be transported off site for separation. Materials that cannot be reused or recycled would be transported to the landfills in the area. With implementation of the identified mitigation measure (MM UT-5a), the Project Applicant would be required to submit a Waste-Diversion Plan demonstrating strategies to divert at least 75 percent of total construction wastes before receiving building permits. This impact would be less than significant.

At current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1360] Under Alternative 3, demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 65 percent of construction waste, as also required by mitigation measure MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Alternative 3 on solid waste would be further reduced. Under Alternative 3, the only construction and demolition activity at Candlestick Point would occur at the Alice Griffith Public Housing site, the Yosemite Slough bridge approach. The Candlestick Park stadium would not be demolished and substantially less construction waste would be generated. The impact of the construction waste generated by the Alternative 4 on the capacity of the Altamont Landfill would be less than significant.

Construction activities, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. The amount of these materials would be that could be disturbed would be less than the Project because the stadium would not be constructed and the overall development program would be reduced requiring less construction and demolition compared to the Project. Hazardous waste would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur intermittently during the construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes. Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. Contaminated soils may require transportation off site and treatment at authorized TSDs. Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of Alternative 3 would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact.

At full build-out, Alternative 3 would generate approximately 9,003.2 tons annually when all uses are fully operational and assuming no waste reduction measures. The amount of solid waste generated under Alternative 3 would be 12,823.8 tons less than the Project because the development program would be substantially reduced. Solid waste generated under Alternative 3 would represent approximately 1.5 percent

[1360] CIWMB, 2009.

(compared to 3.7 percent under the Project) of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons).[1361] All residents and businesses of Alternative 3 would be required to comply with the City's mandatory recycling and composting ordinance. In addition, consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant would prepare a Site Waste Management Plan as required by the identified mitigation measure (MM UT-7a.1) that would specify the methods by which the Alternative 3 would divert operational solid waste to assist the City in achieving its diversion goals. The impact of operational solid waste generated by Alternative 3 on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant.

Nearly all uses under Alternative 3 would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this time. The use of hazardous materials would be less than the Project because the development program would be reduced. The minimal amount of hazardous waste that would be generated by the Alternative 3 could be accommodated by existing TSD facilities. Similar to the Project, this impact would be less than significant.

Electricity, Natural Gas, and Telecommunications

The proposed utility infrastructure improvements for Alternative 3 would include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications, the same as for the Project. This alternative would not include the new stadium, improvements to the CPSRA, or the full Yosemite Slough bridge. As the development would be smaller than the Project, less electricity, natural gas, and telecommunications serves would be required. Infrastructure expansion would not be as extensive as required for the Project. However, these differences between Alternative 3 and the Project would not substantially affect the infrastructure plan as presented for the Project and, therefore, impacts would be the same as for the Project, and less than significant.

Energy

Construction activities associated with implementation of Alternative 3 would require energy sources including electricity, diesel, and gasoline. Construction activities for would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy and would be subject to requirements to minimize wasteful fuel consumption. Alternative 3 would include much smaller development program compared to the Project, with the majority of development occurring at HPS Phase II, and, therefore, the energy use during the construction period would be substantially reduced. The San Francisco 49ers stadium would also not be constructed, which would substantially reduce energy use at the site over the Project. Furthermore, given the type of development proposed under this Alternative, the energy demand created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related energy use associated with development under Alternative 3 would be considered less than significant.

[1361] Solid waste generation for this alternative was estimated using the solid waste generation rates presented in Table III.Q-8.

Implementation of Alternative 3 would result in baseline electricity consumption substantially less than the Project. In addition, Alternative 3 would include the energy savings associated with the Project Applicant's commitments to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project, those efficiency measures would result in consumption of at least 5.4 percent less electricity than a project that would not implement such measures. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts of Alternative 3 to less than significant. The San Francisco 49ers stadium would not be constructed at the HPS Phase II site resulting in a further reduction in electricity demand compared to the Project.

Implementation of Alternative 3 would result in baseline natural gas consumption substantially less than the Project. In addition, Alternative 3 would include efficiency measures similar to the Project resulting in the use of approximately 13 percent less natural gas than a development project without such measures. Those efficiency measures would result in consumption of at least 13 percent less natural gas than a development project without such measures. In addition, the Project Applicant would also implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity, the use of solar thermal energy to provide space cooling with the use of absorption systems, and/or water for space heating and domestic water systems. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential natural gas consumption impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts of Alternative 3 to less than significant. In addition, the San Francisco 49ers stadium would not be constructed at HPS Phase II resulting in reduced natural gas demand compared to the Project.

Alternative 3 would increase trips to and from the Project site, increasing the use of petroleum fuels. However, new trips to the Project site under this Alternative would be substantially less than the Project because the development program would be reduced. Without a stadium at HPS Phase II, game day and event-related fuel consumption would be avoided. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. These programs would be similar to the Project, but would not be as effective because the entire transportation proposed under the Project may not be developed. The transportation system and TDM programs were designed to work for development of Candlestick Point and HPS Phase II as

proposed under the Project. Efficiencies of the system would be reduced compared to the Project because the focus of such improvements would primarily occur at HPS Phase II. However, the Yosemite Slough bridge would serve BRT, bikes and, pedestrians and would result in an overall reduction of automobile trips and petroleum fuel consumption. Similar to the Project, Alternative 3 would not be wasteful with respect to petroleum fuel consumption, and impacts are considered less than significant.

Greenhouse Gas Emissions

Similar to the Project, construction activities associated with implementation of Alternative 3 would emit GHGs associated with diesel and gasoline consumption. Similar to the Project, the construction activities for Alternative 3 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not be a prolonged source of GHG emissions. Alternative 3 would include a much smaller development program compared to the Project, with the majority of development occurring at HPS Phase II, and, therefore, the GHG emissions associated with the construction period would be substantially reduced. The San Francisco 49ers stadium would also not be constructed, which would substantially reduce GHG emissions at the site over the Project. Furthermore, given the type of development proposed under this Alternative, the GHG emissions created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related GHG emissions and climate change associated with development under Alternative 3 would be considered less than significant.

Implementation of Alternative 3 would result in baseline GHG emissions similar to the Project for the HPS Phase II portion, but significantly less at the Candlestick Point portion due to the decrease in the number of dwelling units and absence of commercial uses at Candlestick Point. Alternative 3 would include the GHG emission reductions associated with mitigation measures, including MM GC-1 through MM GC-4, which require the implementation of the Project Applicant's conceptual commitments to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project, Alternative 3 would increase trips to and from the Project site, increasing the GHG emissions associated with transportation. However, this Alternative would also include the Project Applicant's commitment to reduce transportation related GHG emissions: (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. These programs would be similar to the Project, but would not be as effective because the entire transportation system proposed under the Project may not be developed. The transportation system and TDM programs were designed to work for development of Candlestick Point and HPS Phase II as proposed under the Project. Efficiencies of the system would be reduced compared to the Project because the focus of such improvements would primarily occur at HPS Phase II. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of GHGs emitted by shortening trip lengths and shifting trips from vehicular modes of travel. Similar to

the Project, those efficiency measures would result in reductions in GHG emissions compared to a project that would not implement such measures. Thus, GHG emissions at the Project site under development of Alternative 3 would not inhibit the achievement of the goals of AB 32 or the SFCAP. Similar to the Project, GHG emissions and climate change impacts would be less than significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for Alternative 3 and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO2e per service population per year and would result in a less-than-significant impact on climate change. Alternative 3 would reduce total development compared to the Project. Alternative 3 would decrease the housing density and alter the service population which would impact the amount of GHG emissions per service population. Without a quantitative analysis, the comparison to the BAAQMD threshold cannot be judged, and Alternative 3 may not be below the proposed threshold.

Attainment of Project Objectives

Alternative 3 would not meet several of the Project objectives entirely because it would include minimal development at Candlestick Point compared to the Project. Alternative 3 would partially meet the remaining Project objectives because it would include a development program for HPS Phase II similar to the Project. Refer to Table VI-6 (Attainment of Project Objectives Alternative 3) below for a discussion of each objective.

Table VI-6 Attainment of Project Objectives Alternative 3

Objective	*Meets Project Objective?*	*Analysis*
1. The integrated development should produce tangible community benefits for the Bayview and the City.	Y–	Alternative 3 would include some community benefits because development would occur at HPS Phase II. However, compared to the Project, Alternative 3 would include substantially less economic development, affordable housing, parks and open space amenities, and improved connection to the existing Bayview neighborhood. Therefore, Alternative 3 would meet this objective to a lesser extent than the Project.
2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger Bayview neighborhood and should maintain the character of the Bayview for its existing residents.	Y–	Alternative 3 would include a mix of uses and urban design concepts would provide a direct physical, visual, and architectural connection to the Bayview neighborhood and City. However, the majority of development would occur at HPS Phase II. Alternative 3 would include a reduced amount of affordable housing, jobs, and economic opportunities compared to the Project and Alternative 3 would meet this objective to a lesser extent than the Project.
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourages the rebuilding of Alice Griffith Housing.	Y-	Alternative 3 would include a variety of unit types, sizes, and structures, and a wide range of affordability levels. This Alternative would include the redevelopment of the Alice Griffith Public Housing site. Overall there would be a reduced amount of affordable housing units developed under Alternative 3. Therefore, Alternative 3 would not meet this objective to the same extent as the Project.
4. The integrated development should incorporate environmental sustainability concepts and practices.	Y	Although the overall development program would be reduced, Alternative 3 would include similar sustainability principles compared to the Project. Therefore, Alternative 3 would meet this Project objective.
5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure.	N	Alternative 3 would not include construction of a new stadium and would not meet this Project objective.
6. The integrated development should be fiscally prudent, with or without a new stadium.	Y–	Development of Alternative 3 would increase sales tax revenue to the City and would include a development program that would encourage substantial private capital investment at the HPS Phase II site. However, the amount of sales tax generating use and potential private investment would be substantially less than the Project and would meet this objective to a lesser extent than the Project.

Y = Alternative <u>does</u> meet Project objective.
Y- = Alternative meets Project objective, but to a lesser extent than the Project.
Y– = Alternative meets Project objective, but to a significantly lesser extent than the Project.
N = Alternative <u>does not</u> meet Project objective.

VI.C.4 Alternative 4: Reduced CP-HPS Phase II Development; Historic Preservation; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge

Summarized Description

Alternative 4 is a reduced-development alternative. A total of 7,350 residential units would be constructed under this alternative, about 30 percent less than proposed with the Project. Consequently, the population growth anticipated under this alternative would be approximately 17,126 compared to approximately 24,465 under the Project. Land uses proposed under Alternative 4 would be similar to those proposed under the Project; however, residential densities and commercial intensities for most uses would be approximately 30 percent less at full build-out in comparison to build-out of the Project. This alternative also includes preservation of four potentially historic structures at HPS Phase II. This alternative would not include construction of a bridge over Yosemite Slough. The State Parks agreement would occur, but no stadium or marina would be constructed. Table VI-7 (Comparison of Alternative 4 and Project Build-Out) provides a comparison of the uses proposed on the Project site under the Project and Alternative 4. Figure VI-3 (Alternative 4 Land Use Plan) illustrates the land use plan for Alternative 4.

Detailed Description

Candlestick Point

New development at Candlestick Point with Alternative 4 would include a 30 percent reduction in residential, retail, hotel, and office uses. A total of 5,495 residential units would be constructed at Candlestick Point at higher densities than the Project, resulting in more mid-rise structures and towers than under the Project. The performance arena and community service uses would remain as proposed under the Project.

HPS Phase II

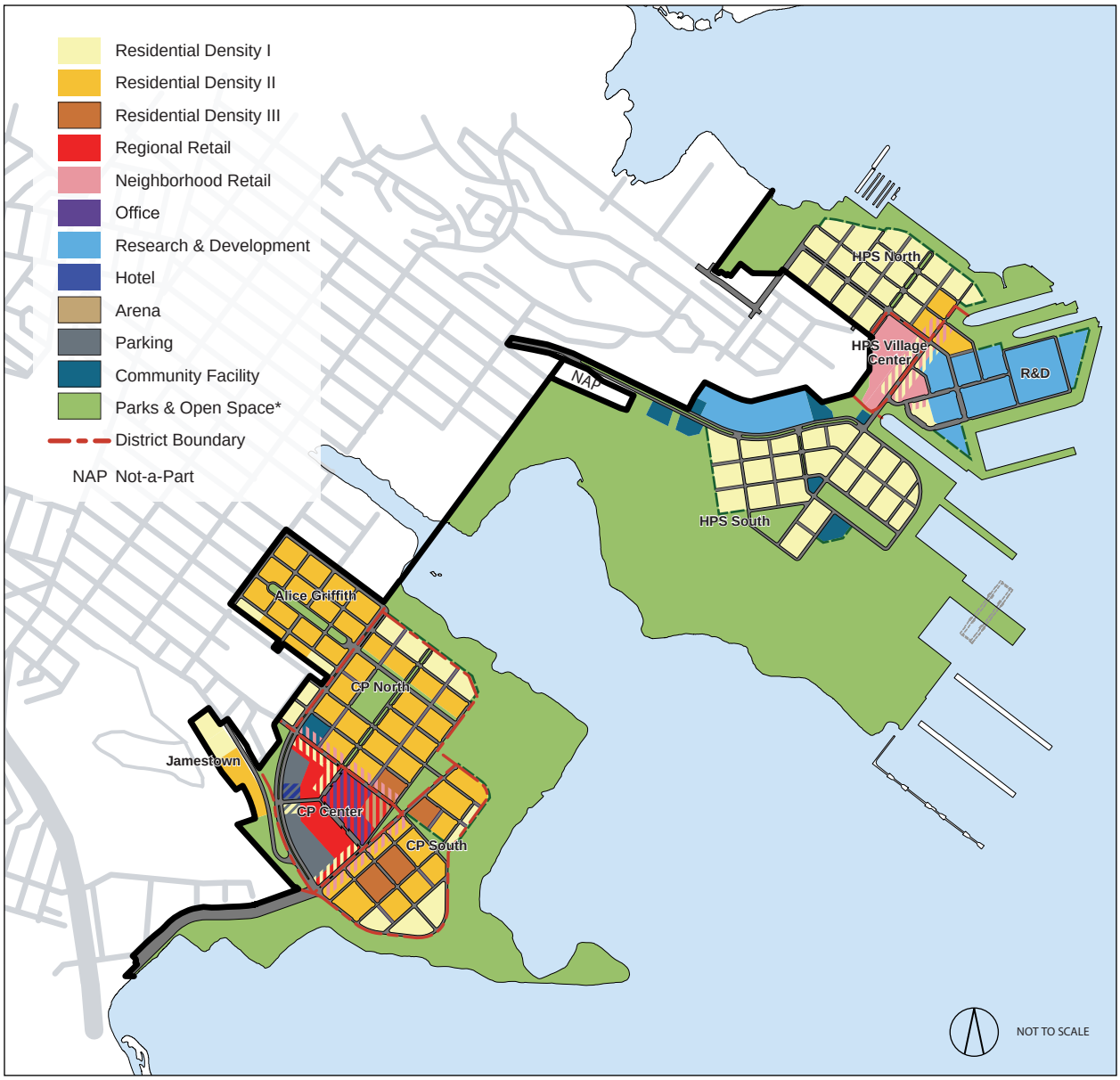
As stated above, retail and R&D floor area would be approximately 30 percent less under this alternative in comparison to the Project. This alternative proposes the expansion of the existing historic district at Drydocks 2 and 3 to include Drydock 4 and Buildings 208, 211, 224, 231, and 253. These buildings would be rehabilitated under Secretary of Interior Standards to accommodate a mix of uses, primarily R&D (refer to Section III.J for more information on Buildings 208, 211, 224, 231, and 253 as historic resources). The buildings occupy approximately 10 acres in the R&D district and would consist of approximately 880,000 gsf of floor area. Housing at HPS Phase II would be reduced by 30 percent. The floor areas for the artists' studios, community services, and performance venue, however, would be the same as for the Project. No stadium or marina would be constructed. No in-water or shoreline improvements associated with a marina would be made.

Table VI-7 Comparison of Alternative 4 and Project Build-Out

Use	*Alternative 4*	*Project*	*Comparison to Project*[a]
Candlestick Point			
Residential (units)	5,495	7,850	-2,355
Retail (gsf):			
Regional Retail	444,500	635,000	-190,500
Neighborhood Retail	87,500	125,000	-37,500
Community Services	50,000	50,000	0
Hotel (gsf)	105,000	150,000	-45,000
Office (gsf)	105,000	150,000	-45,000
10,000-seat Arena (gsf)	75,000	75,000	0
Football stadium (seats)	0	0	0
HPS Phase II			
Residential (units)	1,855	2,650	-795
Neighborhood Retail (gross square feet - gsf)	87,500	125,000	-37,500
Research & Development (gsf)	1,750,000	2,500,000	-750,000
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	30,000	30,000	0
Community Services	50,000	50,000	0
Football Stadium (seats)	0	69,000	-69,000
Marina (slips)	0	300	-300
Totals			
Residential (units)	7,350	10,500	-3,150
Retail (gsf)	619,500	885,000	-265,500
Community Services	100,000	100,000	0
Research & Development (gsf)	1,750,000	2,500,000	-750,000
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	30,000	30,000	0
Other Elements			
Yosemite Slough bridge	No	Yes	—
Shoreline Improvements	Yes	Yes	
State Park Agreement/total acres of State Parkland	Yes/96.7	Yes/96.7	0

SOURCE: Lennar Urban, PBS&J, 2009.

a. Community services, arena, artists' space, and football stadium would remain as proposed under the Project.



SOURCE: Lennar Urban, 2009.

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FIGURE VI-3 Candlestick Point — Hunters Point Shipyard Phase II EIR

ALTERNATIVE 4 LAND USE PLAN

Transportation and Circulation (without Yosemite Slough Bridge)

Under Alternative 4, motorized and non-motorized traffic, including BRT, would be required to circumnavigate Yosemite Slough. The circulation network around Yosemite Slough would be the same as for Alternative 2, as illustrated in Figure VI-1. The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

Between the intersection of Carroll Avenue/Arelious Walker Drive and Crisp Road within HPS Phase II, the proposed BRT line would be routed on Carroll Avenue between Arelious Walker Drive and Hawes Street; on Hawes Street between Carroll Avenue and Armstrong Avenue (currently unimproved); and on Armstrong Avenue between Hawes Street and the Navy rail right-of-way; along the Navy rail right-of-way between Armstrong Avenue and Shafter Avenue; along Shafter Avenue between the Navy rail right-of-way and Arelious Walker Drive; and on Arelious Walker Drive between Shafter Avenue and Crisp Road (currently unimproved).

On Carroll Avenue, Hawes Street, and Armstrong Avenue to the Navy rail right-of-way the BRT line would operate within an exclusive BRT lane, one of the two travel lanes in each direction would be transit-only. Hawes Avenue between Carroll Avenue and Armstrong Avenue, and Arelious Walker Drive between Shafter Avenue and Crisp Road are currently unimproved streets and would be built out to accommodate one transit-only travel lane in each direction. The Navy rail right-of-way between Armstrong Avenue and Shafter Avenue would be improved to provide one transit-only travel lane in each direction. Shafter Avenue between the rail right-of-way and Arelious Walker Drive would be reconfigured to provide four travel lanes, with BRT operating in the center lanes.

Basis for Impact Analysis

The potential impacts of Alternative 4 are generally based on the parameters of the Project, which include reduced size, bulk, and type of development. For Alternative 4, the impacts of the Project are compared to the impacts of a similar mix of land uses and improvements, except for the following:

- The Yosemite Slough bridge would not be constructed
- Approximately 30 percent fewer residential units would be developed at Candlestick Point and HPS Phase II (a reduction of 3,150 units) for a total of 7,350 units
- An approximate 30 percent reduction in non-residential uses at Candlestick Point and HPS Phase II, excluding community services, arena capacity, and artist space
- Potential historic resources at HPS Phase II would not be demolished
- The marina and stadium at HPS Phase II would not be constructed

The footprint of development at Candlestick Point would be reduced in comparison to the Project. The footprint of development at HPS Phase II would also be smaller compared to the Project, as the stadium would not be constructed. The overall development program would be reduced, with a total of 7,350 residential units

constructed under this alternative, approximately 30 percent less than proposed with the Project. Non-residential land uses would also be reduced by approximately 30 percent with the exception of community service uses and artist space. No marina and related shoreline and in-water improvements would be made.

Potential Impacts

Land Use and Plans

Implementation of Alternative 4 would require amendments similar to the Project for the following planning documents: *City of San Francisco General Plan*, *Bayview Hunters Point Redevelopment Plan*, *Hunters Point Shipyard Redevelopment Plan*, Bay Plan, and *San Francisco Bay Area Seaport Plan*. An amendment to the *CPSRA General Plan* would not be required because there would no State Parks land agreement. With implementation of the requirements and mitigation measures identified for the Project in Section III.C through Section III.S of this EIR, development under Alternative 4 would not conflict with any applicable land use plans, policies, or regulations (of an agency with jurisdiction) adopted for the purpose of avoiding or mitigating an environmental effect. Furthermore, development under this Alternative would not conflict with any of the policies, goals, and strategies analyzed for the Project. Although the Project is consistent with the Bay Plan polices with regards to Bay fill, it should be noted that development under Alternative 4 would reduce the amount of Bay fill compared to the Project, because the Yosemite Slough bridge and marina would not be constructed. Similar to the Project, this impact would be less than significant.

Implementation of Alternative 4 would not result in a substantial adverse change in the existing land use character. Development under Alternative 4 would substantially change the character of the site from open space and industrial uses to an urbanized area representative of other areas in San Francisco. This change would improve deteriorated conditions and connectivity, as well as provide numerous areas of open space, extensive landscaped areas, and pleasing architecture, all of which would improve the character of the site. Furthermore, with a 30 percent reduction in residential and most non-residential development, no Yosemite Slough bridge, stadium or marina, the changes to the existing land use character would be less substantial than those created by the Project. Therefore, changes resulting from development under Alternative 4 would not be considered adverse. Furthermore, the transition in scale between adjacent neighborhoods and development under this Alternative, as well as the varied range of proposed uses, would not represent a substantial adverse change in the existing land use character of the Project area. Similar to the Project, this impact would be less than significant.

Population, Housing, and Employment

Construction activities associated with implementation of Alternative 4 would induce direct job growth at the Project site. The number of construction workers that would be employed during the construction period would be reduced compared to the Project because less residential and non-residential development would occur, and construction of the Yosemite Slough bridge, stadium, and marina at HPS Phase II would not occur. It is anticipated that construction employees would commute from elsewhere in the region, rather than relocate to the Bayview Hunters Point neighborhood for a temporary construction assignment. Thus, construction under this Alternative would not generate a substantial, unplanned population increase. Direct and indirect impacts associated with construction employment would be less than significant.

Implementation of Alternative 4 would induce direct and indirect population growth, but this growth would not be considered substantial. Compared to the Project, development under this Alternative would result in 5,495 housing units at Candlestick Point and 1,855 units at HPS Phase II, for a total of 7,350 new housing units at the Project site. The jobs and housing units that would be provided at the site would be closely balanced (approximately 7,219 jobs and 7,350 housing units) so that neither a surplus of housing nor jobs would occur, resulting in indirect residential or employment growth. Housing demand based on employment under Alternative 4 (at 0.74 dwelling units per worker) would total 5,608 dwelling units. Housing provided under Alternative 4 would be greater than the employment-generated demand. Based on existing commuting patterns, housing demand in other communities is estimated to be 45 percent of total housing demand (3,249 units).[1362] Approximately 55 percent of the workers would seek housing in the City (3,970 units). As a result, similar to the Project, the population and employment increase associated with development under Alternative 4 would not be substantial. This impact is considered less than significant.

Transportation and Circulation

Alternative 4, with reduced development at Candlestick Point, residential development and regional retail uses would be decreased and arena uses would not be developed. At HPS Phase II, uses would be decreased. This alternative assumes that the 49ers football team would continue to use the existing Candlestick Park stadium. There would be no Yosemite Slough bridge.

The Transportation Study analyzed Alternative 4 and conclusions from the Transportation Study have been presented below.

Construction Impacts

- Construction activities associated with Alternative 4 would be similar reduced compared to effects with the Project. Localized construction-related traffic impacts would remain significant and unavoidable.

Intersection Conditions

Alternative 4 would have reduced project and cumulative effects at some study intersections. Section III.D discusses traffic effects at those intersections, and the feasibility of mitigation measures. In general, intersection conditions would be significant and unavoidable effects of Alternative 4.

Game day traffic conditions would continue to occur at existing Candlestick Park stadium.

Freeway Conditions

Alternative 4 freeway mainline sections effects, freeway ramp junctions conditions, and ramp queuing effects would generally be similar to the Project conditions. Alternative 4 would have reduced effects at the US-101/Harney northbound on-ramp Sunday PM (LOS D compared to LOS E with the Project); US-101/Bayshore/Chavez northbound on-ramp (Sunday PM LOS D compared to LOS F). Queues on the US-101/Harney northbound off-ramp would not extend onto the mainline segment in Sunday PM conditions. Other freeway impacts with Alternative 4 would be significant and unavoidable.

[1362] Total employment was estimated using the employment factors presented in Table II.C-7 of this EIR and a total population of 17,126. Based on existing commuting patterns, housing demand in San Francisco is estimated to be 55 percent of total housing demand housing demand in other communities is estimated to be 45 percent of total housing demand.

Transit Impacts

Alternative 4 transit conditions assume implementation of Project-related transit improvements. Alternative 4 would have a less than significant impact on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with Alternative 4 would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. As concluded in Section III.D, the transit delay effects would remain significant and unavoidable. During the AM and PM peak hour, Alternative 4 would require up to 28 additional vehicles, the same as with the Project.

Although the alternative BRT route around Yosemite Slough would be technically feasible, it would not be an optimal configuration for a BRT system. BRT service would provide direct, fast, and reliable travel in a dedicated right-of-way, typically with signal priority for VRT vehicles. When these elements are combined, the BRT service takes on a higher quality character than typical local bus service. The Yosemite Slough bridge would provide a dedicated right-of-way and most direct route between Hunters Point Shipyard and points to the west, including Candlestick point, the Bayshore Caltrain Station, and Balboa Park BART. Alternative 4 would not accommodate the BRT route on the bridge proposed with the Project.

Bicycle Impacts

The Alternative 4 bicycle trips would be accommodated within the proposed street and network, although there would not be a Yosemite Slough bicycle and pedestrian route; impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The Alternative 4 pedestrian trips would be accommodated within the proposed sidewalk and pedestrian network, although there would not be a Yosemite Slough bicycle and pedestrian route; impacts on pedestrian circulation would be less than significant.

Parking Impacts

Alternative 4 would result in a demand for about 16,750 spaces, compared with a maximum permitted supply of about 13,040 spaces; therefore, the maximum off-street parking supply would be about 3,710 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Alternative 4 impacts on parking would be less than significant.

This alternative would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

Construction activities associated with implementation of Alternative 4 would occur during a similar build-out period and involve similar activities as the Project. Like the Project, those activities would be visible to surrounding land uses and could impact views of scenic vistas and scenic resources in the area. However, any impacts to views would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Mitigation for the Project would also be implemented with this alternative that would reduce visual construction impacts to less than significant. Therefore, impacts to scenic vistas during construction of Alternative 4 would be the same as under the Project, and less than significant. Construction activities associated with Alternative 4 would not result in adverse effects on any scenic vistas and the impact would be less than significant, the same as for the Project.

There are no scenic resources on the Project site that would be permanently adversely affected by construction of Alternative 4. The Yosemite Slough bridge, stadium, and marina would not be constructed as part of Alternative 4, and temporary impacts to the slough and Bay as scenic resources would be avoided. Therefore, impacts to views of scenic vistas during construction of Alternative 4 would be less than the Project. Construction activities associated with Alternative 4 would have a less-than-significant impact on scenic resources.

As with the Project, construction activities for Alternative 4 would result in exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates that would be visible during construction of the utility infrastructure improvements. Although these activities would take place primarily on site, views of the activities could be available from surrounding land uses. As with the Project, implementation of the identified mitigation measure (MM AE-2) would require the Project developer of Alternative 4 to screen construction sites from public view at street level, provide for appropriate staging of construction equipment, and maintain the cleanliness of construction equipment. Furthermore, without the construction of the Yosemite Slough bridge, marina, or stadium, the number and duration of construction sites under development of Alternative 4 would be less than the Project. Since less development would occur, Alternative 4 would have a reduced construction impact compared to the Project on the visual character or quality of the site and impacts would be less than significant.

Construction of Alternative 4 would occur during daylight hours, and, therefore, glare could be created as a result of reflection of sunlight off windows of trucks and other construction materials that have the potential to generate glare (i.e., glass); however, similar to the Project, the glare created by construction activities at the Project site would not be substantial enough to affect daytime views in the area. Security lighting would be provided after-hours on all construction sites, but this lighting would be minimal, restricted to the Project site, and would not exceed the level of existing night lighting levels in other urban areas in San Francisco. Furthermore, compared to the Project, approximately 30 percent fewer residential units would be constructed, and construction of the Yosemite Slough bridge, stadium, and marina would not occur. Therefore, construction activity under development of Alternative 4 would be less than the Project, creating less potential for glare impacts. In addition, similar to the Project, construction lighting

would comply with all City lighting requirements. Therefore, construction activities for development under Alternative 4 would have less-than-significant light and glare impacts.

Vertical development under Alternative 4 would have a reduced bulk and mass compared to the Project. Alternative 4 would include four towers at Candlestick Point, compared to 11 towers with the Project, and the average tower height would be similar under Alternative 4. There would be no towers at HPS Phase II.[1363] Alternative 4 would change views of the Project site from surrounding public viewpoints, but would not substantially obstruct any scenic vistas. This Alternative would have a lesser degree of impacts than the Project in relation to scenic vistas because the Yosemite Slough bridge, the stadium, and the marina would not be constructed. Similar to the Project, development of the Project would not block publicly accessible views of the Bay or other scenic vistas. Views of the East Bay and the Bay from the Project site would be maintained within public access areas, as well as at City and State parks located within Candlestick Point. Additionally, such views from HPS Phase II would be maintained on the site and within public access areas, such as from HPS Phase I Hilltop Park. While development of Alternative 4 would include high-rise towers at Candlestick Point, those towers would be shorter compared to the Project, and because they would not be clustered together, the development would not substantially obstruct views of the Bay or beyond from any long-range viewpoints. The visually prominent new stadium would not appear on the HPS Phase II site. Therefore, similar to the Project, development under Alternative 4 would not substantially obstruct any scenic vistas, and this impact would be less than significant. This impact would be less than under the Project, however, because of the removal of several towers.

Vertical development under Alternative 4 would have a reduced bulk and mass compared to the Project, as described above, due to the 30 percent reduction in residential units and most non-residential uses throughout the Project site. Alternative 4 would also not include construction of the Yosemite Slough bridge stadium, or the marina. Development under Alternative 4 would not substantially damage scenic resources that contribute to a scenic public setting. Alternative 4 would include redevelopment of the Park stadium area and associated paved and unpaved parking lots by replacing degraded urban areas and outdated residential development with new, well-designed urban development and integrated public parks. The Yosemite Slough bridge and roadway approaches would also not be constructed and the appearance of the slough would be unchanged. Scenic resources at HPS Phase II would be retained, including the Re-gunning crane. Shoreline improvements at Candlestick Point and HPS Phase II would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 4 would not damage or remove any identified scenic resources that contribute to a scenic public setting and the impact would be less than significant.

Alternative 4 would result in a reduced development program compared to the Project, with a 30 percent reduction in residential uses and most non-residential uses and no development of the Yosemite Slough bridge, stadium, or marina. Alternative 4 would change the visual character of the Project site. However, similar to the Project, Alternative 4 would not substantially degrade the visual character or quality of the Project site area or its surroundings. In fact, development under Alternative 4 would improve the degraded and deteriorated condition of much of the Project site. Development under Alternative 4 would replace the existing conditions with a more dense urban setting, and would not represent an adverse change. The

[1363] The average tower height at Candlestick Point was estimated to be similar to the Project, due to the 30 percent reduction in residential units and most non-residential uses and the reduced development footprint at Candlestick Point.

proposed shoreline improvements would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 4 would not substantially degrade the visual character or quality of the Project site or its surroundings. The impact would be less than significant.

- Development under Alternative 4 would increase lighting on the Project site relative to existing outdoor lighting, and new building surfaces would increase the level of illumination in the area. However, vertical development under Alternative 4 would have a reduced bulk and mass compared to the Project due to the 30 percent reduction in residential uses and most non-residential uses. Nighttime lighting would be reduced compared to the Project as a result of the reduced development potential and because lighting for the marina, stadium, and CPSRA improvements would not be installed. Therefore, lighting and glare impacts would be reduced compared to the Project and the lighting impact from the stadium, although less than significant for the Project, would be eliminated under this alternative. Area lighting would illuminate larger areas that are well traveled so as to promote way finding and provide for a safe environment. In addition to area lighting, building lighting would be angled towards building surfaces for aesthetic purposes and/or to illuminate signs. Like the Project, both types of lighting would be designed to avoid direct visibility of the light source. Resolution 9212 prohibits the use of highly reflective or mirrored glass in new construction. Implementation of the identified mitigation measures (MM AE-7a.1, MM AE-7a.2, MM AE-7a.3, and MM AE-7a.4) and compliance with Resolution 9212 would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light, screening vehicle headlights to the maximum extent feasible, and eliminating or minimizing increased glare by the use of non-reflective glass and non-reflective textured surfaces within the proposed development area. Impacts would be less than significant under Alternative 4.

Shadows

- Vertical development under Alternative 4 would have a reduced bulk and mass compared to the Project. Alternative 4 would include four towers at Candlestick Point, compared to 11 towers with the Project, and the average tower height would be similar under Alternative 4. There would be no towers at HPS Phase II.[1364] The stadium would not be constructed. The buildings developed under Alternative 4 would include a similar layout and orientation compared to the Project. At Candlestick Point, the existing public open space, Bayview Park and Gilman Park, would not be affected by new shading from development under Alternative 4. Gilman Park would experience some shading on winter afternoons. Those shadows would be cast by buildings that do not exceed 40 feet in height, are not subject to *Planning Code* Section 295, and, therefore, would not be considered an adverse impact. Some new shadows would be cast on Bayview Park; these would have a less-than-significant effect on that park.

The CPSRA would be affected by new shade in the afternoon but most areas would experience limited to no new shadow from development under Alternative 4. Fewer shadows would be cast in the CPSRA compared to the Project because the adjacent development would have reduced bulk and mass compared to the Project. At HPS Phase II, the existing public open space, India Basin Shoreline Park and India Basin Open Space, would not be affected by new shading from development under Alternative 4. New shadows

[1364] The average tower height at Candlestick Point was estimated to be similar to the Project, due to the 30 percent reduction in residential units and most non-residential uses and the reduced development footprint at Candlestick Point.

cast by development under Alternative 4 on proposed new parks throughout the year would range from little or no shading to large areas of certain parks receiving new shade, particularly in the late afternoon during the vernal and autumnal equinoxes. The extent and duration of shadow on new public sidewalks would increase along street corridors of Alternative 4. Compared to the Project, this new shadow would be reduced and not exceed that which would be expected in a more urban area. New shade created by implementation of Alternative 4 would occur at limited times of the day and year, and would not substantially affect the use of outdoor recreational facilities or open space. Since less overall development would occur under Alternative 4, shade and shadow impacts would be of a lesser degree than the Project, and this impact would be less than significant.

Wind

Development under Alternative 4 would include only four tower structures at Candlestick Point and no tower structures at HPS Phase II. In addition, the 156-foot tall stadium would not be constructed. The remaining towers on Candlestick Point would have a similar average height to the Project towers, which would extend above surrounding buildings and intercept a large volume of wind. Because of the exposure of tall structures to wind, the tower structures proposed under Alternative 4 would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open space areas. The degree of change in pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. Structures nearing or over 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 miles per hour for a single hour of the year would be exceeded. Similar to the Project, the street grid of Alternative 4 would not align with predominant west and west-northwest wind directions and would, therefore, not result in channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potentially significant pedestrian-level wind acceleration at the Project site.

Implementation of the identified mitigation measure (MM W-1a) would reduce the potential impact from wind for development of Alternative 4 by requiring review of all buildings that could result in adverse wind impacts by a qualified wind consultant. If the review determines that would be any exceedances of the wind hazard criteria, the design must be revised to reduce the impact below the established threshold. Implementation of required design changes, if any, would reduce potential hazardous wind effects at the pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas. Compliance with the mitigation measures would ensure pedestrian safety in pedestrian-access areas. Similar to the Project, through implementation of the identified mitigation measure, wind impacts would be less than significant. Elimination of the bridge, several towers, and the stadium would reduce the potential for adverse wind effects at street level compared to the Project. However, the Project includes mitigation measures that reduce this impact to less than significant. The impact of Alternative 4 would be less than significant, and somewhat less than the Project.

Air Quality

As the footprint of development, the total amount of development, and the land uses provided with Alternative 4 would be reduced compared to the Project, air quality impacts of Alternative 4 would be less than the Project.

Construction activities for Alternative 4 would generate dust; however, they would need to comply with the San Francisco Health Code and BAAQMD requirements. Implementation of MM HZ-15, which would require the Applicant to ensure that construction contractors comply with the dust control strategies included in an approved dust control plan as part of a site-specific dust control plan, would reduce the impacts caused by construction dust to a less-than-significant level.

Construction activities could also create DPM; however, as the development of Alternative 4 would be considerably less than under the Project, implementation of MM AQ-2.1 and MM AQ-2.2, accelerated emission control implementation on construction equipment, would keep this impact less than significant. Construction activities could also generate TAC-containing PM_{10}; however, as construction activities for Alternative 4 would be fewer than for the Project, this impact would be less than significant.

Though operational emissions associated with Alternative 4 would be much lower than with the Project, due to the scale of Alternative 4, the mass emissions would exceed the BAAQMD CEQA thresholds and this impact would remain significant and unavoidable, similar to the Project. Alternative 4 has reduced R&D square footage, and potential TAC emissions from facilities in R&D areas would also be reduced. With the implementation of MM AQ-6.1 and MM AQ-6.2, this impact would be less than significant, and less than the Project.

Additionally, as the scale of Alternative 4 is smaller than the Project, the impacts from Alternative 4 traffic (e.g., carbon monoxide and $PM_{2.5}$) would be less than the Project and therefore continue to be less than significant.

According to the current BAAQMD CEQA Guidelines, odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that the BAAQMD regards with potential to generate considerable odors include: wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, oil refineries and chemical plants. Alternative 4 would be a large mixed-use development containing residential, office, retail, R&D, recreational, and entertainment uses. Although there may be some potential for small-scale, localized odor issues to emerge around proposed sources such as solid waste collection, food preparation, etc., substantial odor sources and consequent effects on on-site and off-site sensitive receptors would be unlikely and would be resolved by interventions after receipt of any complaints. This would be a less-than-significant impact. No mitigation is required.

The Project is consistent with regional air quality plans. As Alternative 4 would be smaller than the Project, Alternative 4 would be consistent with these plans. Alternative 4 promotes the use of alternative transportation modes, such as transit, biking and walking. In addition, it puts housing in close proximity with jobs and retail establishments, reducing the length of trips and further reducing reliance on single-occupancy vehicles. Therefore, Alternative 4 conforms to the regional air quality plan and there would be a less-than-significant impact. No mitigation is required.

Noise

As the footprint of development, the total amount of development, and the land uses provided with Alternative 4 would be reduced compared to the Project, noise impacts of Alternative 4 would be the less than the Project.

Construction activities for Alternative 4 would expose sensitive receptors to increased noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which generally prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction Best Management Practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels, similar to the Project.

Construction activities for Alternative 4 would result in a temporary or periodic increase in ambient noise levels that would be noticeable and likely cause for human annoyance. Construction activities would occur within 25 feet of existing and future residential uses. Pile driving activities could result in substantial noise levels of up to 107 dBA at new residential uses on the site or at adjacent existing residences. Construction-related temporary increases in ambient noise levels would be considered significant and unavoidable, the same as for the Project.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction Best Management Practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under Alternative 4, but not to a less-than-significant level, as vibration levels from pile driving activities would be similar to the Project for the residential uses within the HPS North District; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of Alternative 4, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with Alternative 4, such as truck deliveries, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of Alternative 4 would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Although approximately 30 percent less development would occur under Alternative 4, significant impacts identified for the Project along Carroll Avenue, Gilman Avenue, and Jamestown Avenue would remain with implementation of Alternative 4.

Because Alternative 4 would not include a football stadium at HPS Phase II and the stadium at Candlestick Point, noise impacts identified for the Project from football games and concerts would not occur with implementation of Alternative 4.

Cultural Resources

- Compared to the Project, development under Alternative 4 would not result in the demolition of Buildings 211, 224, 231, and 253, which are potential historic resources in the CRHR-eligible Hunters Point

Commercial Dry Dock and Naval Shipyard Historic District (refer to Appendix V1 [Page & Turnbull Feasibility Report]). The buildings occupy approximately 10 acres in the R&D district and would consist of approximately 880,000 gsf of floor area. Building 208 would be mothballed, the same as under the Project. Building 231 would be rehabilitated to accommodate parking and Buildings 211 and 253 would be rehabilitated to accommodate R&D uses (refer to Appendix V1 [Page & Turnbull Hunters Point Shipyard Feasibility Study, Revised September 9, 2009]). Implementation of Alternative 4 would retain Drydocks 2 and 3 and rehabilitate Buildings 140, 204, 205, and 207 at the HPS Phase II site in accordance with the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. Therefore, the impacts of developing Alternative 4 on these historical resources would be less than significant and would avoid the significant impact of the Project on historic resources.

Similar to the Project, construction activities associated with Alternative 4 could result in a substantial adverse change in the significance of archaeological resources, as the Project site is likely to contain subsurface archaeological resources from the Native American, Chinese fishing village, prehistoric, and maritime development periods. Implementation of the identified mitigation measure (MM CP-2a) would reduce the effects on archaeological resources to a less-than-significant level for development under Alternative 4. The Yosemite Slough bridge, marina, and stadium would be eliminated, and potential disturbance of archaeological resources resulting from construction of these components would be avoided, although the Project would mitigate this potential impact to less than significant. Overall, the impacts would be less than significant, and substantially similar to the impacts of the Project.

Construction activities associated with Alternative 4 could result in a substantial adverse change in the significance of paleontological resources. The Bay mud underlying portions of the fill is expected to contain paleontological resources, and there is a possibility of fossils being discovered during construction-related excavation associated with the shoreline improvements. Potential impacts related to construction of the Yosemite Slough bridge, stadium, and marina would be avoided under this Alternative, because these improvements would not be constructed. Similar to the Project, implementation of the identified mitigation measure (MM CP-3a) would reduce the effects of construction-related activities to potential paleontological resources in in-water and off-site areas to a less-than-significant level for development under Alternative 4.

Hazards and Hazardous Materials

Under Alternative 4, the construction impacts associated with Hazards and Hazardous Materials would be somewhat reduced as compared to the Project because the overall development footprint would be reduced, including the elimination of the Yosemite Slough Bridge, marina, and stadium, resulting in a smaller area subject to disturbance. The preservation of historic buildings in HPS Phase II would also result in less subsurface disturbance in that portion of the site. Further, the 30 percent reduction in residential and most non-residential uses and absence of the marina would reduce the risk of exposure to hazardous materials during Project operation.

The development proposed under Alternative 4, while reduced in density, would result in the same development footprint at Candlestick Point and construction-related impacts at Candlestick Point for Alternative 4 would be the same as for the Project. At HPS Phase II, the development footprint would be somewhat reduced, resulting in a comparable reduction in the potential for exposure to hazardous materials during construction as compared to the Project.

Site preparation would still include deep excavations for large structures such as for residential towers, with plans to use the cut material elsewhere within the Project site as fill, trenching for utility lines, dewatering, grading and compaction and other earth-disturbing activities. As portions of the site are known to contain elevated levels of chemicals in the soil, construction activities could result in exposure of construction workers, the public or the environment to unacceptable levels of hazardous materials if not handled appropriately. MM HZ-1a would reduce effects related to exposure of known contaminants at Candlestick Point by requiring compliance with Article 22A or an equivalent process. At HPS Phase II, potential effects related to exposure to hazardous materials from construction activities would be mitigated through requirements to comply with restrictions imposed on the property through the federal site clean-up process (MM HZ-1b, MM HZ-9, and MM HZ-12). Disturbance of contaminated soil, sediments, and groundwater in the shoreline areas at HPS Phase II, although reduced in scope with the elimination of the marina and the Yosemite Slough Bridge, would still occur as a result of shoreline improvements. As for the Project, MM HZ-10b would ensure approval of workplans by the Navy and regulatory agencies prior to any work in the shoreline areas. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts from disturbance of contaminated soil, groundwater and sediments.

At both Candlestick Point and HPS Phase II, compliance with MM HZ-2a.1 would require the preparation and implementation of contingency plans to address unknown contaminants that might be encountered during construction, and compliance with MM HZ-2a.2 would require preparation and implementation of health and safety plans to protect construction workers from exposure to hazardous materials during construction activities. Construction activities could require off-site transport of contaminated soil or groundwater; compliance with federal, state, and local regulations would ensure that no unacceptable exposure to chemicals occur as a result of these activities. Further, mitigation measures MM HY-1a.1, MM HY-1a.2, and MM HY-1a.3 would ensure that no unacceptable levels of hazardous materials in soil in surface runoff or in groundwater are discharged to the sewer system or discharged from the site to the Bay. Hazardous materials impacts from all of the above construction-related activities would be reduced to less than significant with the implementation of the mitigation measures identified above, the same as for the Project.

Development under Alternative 4, as for the Project, would require the installation of foundation support piles, which could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to migrate to the deeper groundwater aquifer. However, as for the Project, MM HZ-5a, which requires preparation of a plan for pilot boreholes for each pile to prevent disturbance of potentially contaminated fill materials and would reduce this potential impact from pile driving to less than significant, the same as for the Project.

Alternative 4 would not include construction of the Yosemite Slough Bridge, which would avoid impacts associated with disturbance of potentially radiologically impacted soils at HPS Phase II in the vicinity of Parcels E and E-2. Also, because Alternative 4 would preserve historically significant buildings on HPS Phase II proposed for demolition under the Project (Buildings 211, 224, 231, and 253), this Alternative would result in less land disturbance in the area of the site where these buildings are located as compared to the Project, thus reducing the potential for exposure to hazardous materials in soil or groundwater in this area.

- As part of Alternative 4, the retained historic buildings would require abatement of existing hazardous materials such as asbestos, PCBs from electric fixtures, and lead-based paint. Those abatement activities would be a typical step in a reuse and rehabilitation plan. In addition, any contaminated soil or groundwater at the site of those buildings would be remediated or encapsulated under methods subject to the various legal or administrative requirements outlined in Draft EIR Section III.K. Those remediation activities would not preclude rehabilitation or reuse of the buildings in the identified Hunters Point Commercial Dry Dock and Naval Shipyard Historic District if they have been cleared for reuse by the Navy. The Navy has identified Buildings 211 and 253 as radiologically impacted buildings. The Navy would not make a determination as to whether these buildings can be cleared for reuse until at the earliest, fall 2010, but all required radiological remediation would be completed before the Navy transfers the property to the Agency. As noted in Draft EIR Section III.K, pages III.K-27 to -28, "Basewide Historical Radiological Assessment" section:

- > The overall conclusion of the Historical Radiological Assessment (HRA) was that although low levels of radioactive contamination exist at HPS, no imminent threat or substantial risk exists to tenants, the environment of HPS, or the local community.[313] This conclusion has been reinforced by subsequent Finding of Suitability for Lease (FOSL)[314] issued by the Navy for areas in Parcel B and Building 606 in Parcel D and approved by the regulatory agencies authorizing leases for various uses involving hundreds of employees, artists, and visitors in close proximity to various "impacted" sites each day. A Basewide Radiological Work Plan was subsequently prepared, describing survey and decontamination approaches to be implemented in support of radiological release of buildings and areas.[315]

Alternative 4 would place housing in the area of the HPS Phase II site proposed for the stadium and stadium parking. The Navy's cleanup plan is designed to remediate the HPS site to levels acceptable for the planned uses in the existing HPS Redevelopment Plan. To the extent that Alternative 4 proposes to place housing in areas not designated for residential use in the existing HPS Redevelopment Plan, additional hazardous materials remedial work could be required, which could result in some increased risk to workers, the public and environment from exposure to hazardous materials during the construction process. Any property that has not been remediated for unrestricted use at the time of transfer will have use restrictions placed on the property in compliance with the federal clean-up process. For use restrictions to be removed, the Project Applicant would be required by the transfer documents to obtain approval from the regulatory agencies overseeing the clean-up process before residential uses could be placed on these portions of the site. Any remedial activities undertaken as part of the construction process would be subject to the requirements in MM HZ-1b, which requires construction activities at HPS Phase II to be done in accordance with all restrictions imposed on the site by the federal regulatory clean-up process and these impacts would be less than significant, the same as for the Project.

Potential impacts associated with disturbance of naturally occurring asbestos would be similar to those associated with the Project and would be mitigated through MM HZ-15, which requires the preparation of dust control plans as required by BAAQMD and DPH. As for the Project, Alternative 4 would involve the demolition of existing structures that may contain asbestos-containing building materials, lead-based paint, and other hazardous materials. The preservation of historic buildings may likewise result in disturbance of such hazardous materials. The existing regulatory framework and approval process would avoid potential hazards from demolition or building preservation activities and impacts would be less than significant, the same as the Project.

Alternative 4 would involve off-site roadway improvements, which could result in disturbance of hazardous material in soil or groundwater. Unacceptable exposures would be controlled as for the Project by implementation of MM HZ-1a, and hazardous materials impacts from these activities would be less than significant.

Project operations would involve routine use, storage, transport, or disposal of hazardous materials. The use of such materials would be reduced compared to the Project, because of a 30 percent reduction in residential and most non-residential uses. In addition, the marina would not be constructed, resulting in less hazardous materials usage associated with boat cleaning and maintenance supplies. Compliance with applicable federal, state, and local regulations related to the use, storage and transport of such materials would result in a less-than-significant impact from hazardous materials usage, the same as for the Project.

Geology and Soils

Construction activities, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. However, requirements to control surface soil erosion during and after construction of Alternative 4 would be implemented through the requirements of the identified mitigation measure (MM HY-1a.1), and adverse effects on the soil such as soil loss from wind erosion and stormwater runoff would be reduced to a less-than-significant level. Soil erosion impacts associated with construction of the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 4. Soil erosion impacts would also be reduced because the development footprint at Candlestick Point and HPS Phase II would be reduced.

Construction activities would have the potential to affect groundwater levels. Construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. Dewatering could cause settlement of adjacent soils that could damage the overlying foundations of existing buildings. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by the identified mitigation measure (MM GE-2), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Similar to the Project, settlement hazards related to dewatering would be less than significant for development under Alternative 4, the same as for the Project.

Development of Alternative 4 would require rock removal activities at the Alice Griffith and Jamestown districts that could result in damage to structures from vibration or settlement caused by the fracturing of bedrock for excavation. With implementation of the identified mitigation measure (MM GE-3), vibration from controlled rock fragmentation in the area would not cause unacceptable settlement at adjacent or nearby properties. Similar to the Project, settlement hazards related to controlled rock fragmentation would be less than significant for development under Alternative 4, the same as for the Project.

The potential for exposure to adverse effects caused by seismic groundshaking and seismically induced ground failure such as liquefaction, lateral spreading, landslides and settlement exists at the Project site. The identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-5a, and MM GE-6a) would require design-level geotechnical investigations for development under Alternative 4. Design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of structures, as required by the SFBC through review by DBI. The structural

design review would ensure that all necessary mitigation methods and techniques are incorporated in the design for foundations and structures to reduce potential impacts from ground failure or liquefaction to a less-than-significant level for development under Alternative 4. Seismic-related groundshaking hazards associated with the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 4, although the Project would mitigate these potential impacts to less than significant.

The existing shoreline exhibits active erosion and consists of areas of unprotected slopes and dilapidated naval pier and wharf structures. Similar to the Project, Alternative 4 would include numerous shoreline improvements, including additional concrete revetments, creation of new beach and tidal habitat, and some grading and importation of fill at certain locations. These improvements would improve the stability of the shoreline. Therefore, Alternative 4 would not result in the exposure of structures and facilities at the Project site to substantial adverse effects caused by shoreline instability. Similar to the Project, the impact would be less than significant.

The potential for adverse effects caused by landslides, settlement, expansive and corrosive soils, exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual elements of development for Alternative 4, as specified in the identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, MM GE-5a, MM GE-6a, MM GE-10a, MM GE-11a) for the Project. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of those mitigation measures, impacts with regards to landslides, settlement, and expansive and corrosive soils would be less than significant. Potential ground failure impacts associated with construction of the Yosemite Slough bridge would be avoided because no bridge would be constructed under Alternative 4.

Hydrology and Water Quality

Alternative 4 would be required to comply with water quality standards, the same as the Project. Therefore, construction activities associated with Alternative 4 would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With implementation of mitigation measures MM HY-1a.1 (preparation of a Storm Water Pollution Prevention Plan—SWPPP—for discharges to the Combined Sewer System), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan), impacts would be less than significant, similar to the Project.

Construction activities associated with Alternative 4 would include excavation for building foundations and underground utilities that could require short-term and/or long-term dewatering of the affected areas. As no extensive underground space is proposed for Alternative 4, the installation of underground building elements and utilities would not substantially alter groundwater levels, similar to the Project. As such, Alternative 4 would not substantially deplete groundwater supplies and would result in a less-than-significant impact, similar to the Project. As the total amount of open space under Alternative 4 would be slightly greater compared to the Project, the amount of permeable surface within the Project footprint would also be greater. Therefore, Alternative 4 would not interfere substantially with groundwater recharge

such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within Alternative 4 site and, thus, no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of Alternative 4, the existing drainage patterns within the area would generally be preserved. Construction activities associated with Alternative 4 would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated with Alternative 4, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of an SWPPP) impacts would be less than significant, similar to the Project.

Operation of Alternative 4 would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of Alternative 4. In addition, Alternative 4 would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. As the extent of impervious surfaces for Alternative 4 would be reduced compared to the Project, impacts would be less than the Project.

Development under Alternative 4 would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of Alternative 4 could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exists at or near the site currently, or result in substantial erosion, siltation, or flooding on or off site, similar to the Project. Implementation of Alternative 4 would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to

discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of Alternative 4 would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of Alternative 4 would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, Alternative 4 would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

Alternative 4 would involve removal and/or modification of areas that have the potential to contain special-status species, including: seven potentially breeding avian species, one bat species, and four fish species (green sturgeon, Chinook, steelhead, and longfin smelt). Alternative 4 would also have the potential to affect designated critical habitat of the green sturgeon and Central California Coast steelhead and thus, directly impact threatened and/or endangered species through habitat conversion or unauthorized take. However, because Alternative 4 does not include construction of the Yosemite Slough bridge, the stadium, and the marina, potential impacts to such species would be reduced. However, construction activities related to shoreline improvements at HPS Phase II and other development throughout the Project site could still adversely affect these species. In addition, activities would occur within habitats of locally rare or sensitive species such as Pacific herring and Olympia oysters, as well as avian species protected by the MBTA. Alternative 4 would include implementation of the ecological design features described in the Project's Draft Parks, Open Space, and Habitat Concept Plan that would result in multiple measures to avoid, limit, and mitigate for impacts to special-status and legally protected species. Specifically, the design components would remove invasive species; restore, preserve, and enhance wetland, aquatic, and grassland habitats; revegetate the site with extensive planting of trees and shrubs; increase the vegetative cover for foraging and dispersing animals; and maintain and enhance habitat connectivity along the shoreline of HPS Phase II.

With implementation of the identified mitigation measures(MM BI-5b.1 through MM BI-5b.4, MM BI-6a.1, MM BI-6a.2, MM BI-6b, MM BI-7b, MM BI-9b, MM BI-18b.1, and MM BI-18b.2) and ecological design features, Alternative 4 would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Impacts related to construction of the Yosemite Slough bridge, marina, and stadium would be avoided because those improvements would not be constructed under Alternative 4. Consequently, impacts would be less than the Project, and, similar to the Project, impacts would be less than significant after mitigation.

Similar to the Project, development of Alternative 4 could have a substantial adverse effect on sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFG or USFWS. The only sensitive habitats other than wetlands and aquatic habitats are eelgrass and areas designated as EFH. Impacts to such communities resulting from construction of the Yosemite Slough bridge, shoreline abutments for the proposed marina, and installation of the breakwater at HPS Phase II would be avoided because those improvements would not be constructed under Alternative 4. With implementation of the identified mitigation measures (MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12b.1, MM BI-12b.2, MM BI-12b.3, MM BI-18b.1, MM BI-18b.2, MM BI-19b.1, and MM BI-19b.2), impacts of Alternative 4 on sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFG, NMFS, or USFWS would be reduced to a less-than-significant level. Potential impacts to eelgrass beds would be the same as the Project (eelgrass beds are not located near Yosemite Slough), while impacts to EFH would be less than the Project since construction associated with the Yosemite Slough bridge would be avoided and, thus, EFH would not be impacted through the construction of pilings required to support the bridge.

The shoreline improvements included Alternative 4 could have substantial temporary and permanent adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. However, such impacts would be substantially reduced compared to the Project because the Yosemite Slough bridge and marina would not be constructed. As a result, impacts to approximately 3 acres of other waters, 0.01-acre tidal salt marsh, and 1 acre of shadow fill would be avoided. The identified mitigation measures (MM BI-4a.1 and MM BI-4a.2) would reduce the effects of construction-related activities to wetlands and other waters by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation, preservation, and/or restoration), obtaining permits from the USACE, SFRWQCB, and BCDC that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. With implementation of the identified mitigation measures, the impacts of development under Alternative 4 to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project. However, impacts would be less than the Project.

Similar to the Project, development of Alternative 4 could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site. The Project site is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways occur within the Project site. However, similar to the Project, implementation of Alternative 4 would place new residential towers (three fewer than the Project). The increase in strike hazards from the tall buildings to alter flight paths could substantially interfere with migratory avian flight paths, which would be considered a potentially significant impact to migratory birds. The potential for lighted stadium towers to present a strike hazard to migratory birds would be eliminated under Alternative 4. With respect to aquatic species, although migratory fish could continue to move though the open water and Yosemite Slough, the Project site does not contain any substantial migratory fish pathways such as anadromous fish streams. However, construction of

breakwaters and other shoreline treatments in HPS Phase II would occur near eelgrass beds, which could directly or indirectly impact eels such that productivity and survival of these habitats would be substantially reduced. Alternative 4 would not include construction of the Yosemite Slough bridge, stadium, or marina, which would result in fewer potential impacts to these habitats compared to the Project. Similar to the Project, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-20a.1, and MM BI-20a.2), the potential impacts of Alternative 4 would be reduced to a less-than-significant level because it would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Similar to the Project, Alternative 4 would be required to comply with mitigation measure MM BI-14a to ensure that Project development would not result in conflicts with the City's tree protection ordinances. With implementation of MM BI-14a, Alternative 4 would not conflict with any local policies or ordinances protecting biological resources and impacts would be less than significant, similar to the Project.

Public Services

Police Protection

During construction of Alternative 4, emergency access to the Project site would be maintained through compliance with the CTMP, as required by mitigation measure MM TR-1. The purpose of a CTMP is to ensure that the impacts of construction on the public domain, in particular with respect to temporary interruptions to vehicular and pedestrian traffic, are considered and addressed. Because Alternative 4 would include the same mitigation as the Project, there would be a similar requirement to prepare a CTMP for Alternative 4 that would address temporary impacts on circulation during construction. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. Construction activities associated with implementation of Alternative 4 also could increase demand for SFPD services if the site is not adequately secured, providing increased opportunity for criminal activity. To ensure adequate site security, mitigation measure MM PS-1 would require the Project Applicant to provide security during construction. Therefore, this impact would be less than significant, the same as for the Project.

Implementation of Alternative 4 would increase resident and employee population at the Project site. However, because 30 percent fewer residential units would be constructed under this Alternative, the associated demand for additional police personnel would be reduced compared to the Project. Alternative 4 would result in a potential increase in the need for 37 additional police personnel to provide a comparable level of service to existing conditions compared to the Project's potential increase in need of 53 personnel.[1365] The SFPD evaluates the need for additional officers by sector, and not station or district needs. While it is unlikely that 37 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development of Alternative 4.

[1365] The number of required police officers need to meet comparable level of service to existing conditions was determined using the total daytime population of Alternative 4 (residential population of 17,126 plus 7,578 employees) and the ratio of officers to population presented in Table II.O-2 (1:665 officer to population).

If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 sf could be constructed within the Project site, on land designated for community-serving uses. As part of Alternative 4, up to 100,000 gsf of land divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses including a police station. Construction of a new SFPD facility (counter, storefront, or other configuration) within these community services uses and/or the reconfiguration or expansion of the existing Bayview Station would be funded by the Project Applicant. Similar to the Project, Alternative 4 includes community service use areas, and as construction would be funded by the Project Applicant, the SFPD would maintain acceptable levels of police service. The stadium would not be constructed, which would eliminate the need for additional police services on game days. Therefore, development of this Alternative would not require new or physically altered police facilities beyond the scope of the Project in order to maintain acceptable police services. This impact is considered less than significant.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Fire and Emergency Medical Services

Alternative 4 would add 7,350 residential units and substantially increase employment-generating uses, resulting in an employment population of 7,219. The increase in the residential and daytime employment population (for a total population of 24,345, including a residential population of 17,126 plus 7,219 employees), combined with an increase in the intensity of physical development on the Project site, would result in new demand for fire protection and emergency medical services.

During construction of Alternative 4, emergency access to the Project site would be maintained through compliance with the CTMP, as required by mitigation measure MM TR-1. Construction of a new SFFD facility on land designated for community-serving uses on the Project site (where costs would be borne by the Project Applicant), would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. Similar to the Project, construction of 100,000 gsf of community facilities, which would include a new SFFD facility, would be included as a component of Alternative 4. The stadium would not be constructed, which would eliminate the need for additional emergency services on game days. Therefore, development under Alternative 4 would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is considered less than significant.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Schools

A total of approximately 1,492 school-age children would live within the Project site following full build-out of Alternative 4.[1366] While schools in the Project vicinity have approximately 49 percent capacity remaining in the 2008-2009 school year, it is likely that a 12 percent overcapacity of SFUSD as a result of citywide population growth in 2030 would occur. Similar to the Project, the payment of school impact fees pursuant to SB50 would constitute full mitigation for any potential schools impacts. This impact is considered less than significant for development under Alternative 4, the same as for the Project.

Libraries

Construction of Alternative 4 would not result in impacts to the SFPL. No library branches are located on the Project site. All library services would be available to the community throughout the duration of construction. As such, no impact to library services during construction of Alternative 4 would occur.

Residential and nonresidential development associated with Alternative 4 would increase demand for local library services in the Bayview neighborhood, although due to a 30 percent reduction in residential units, this demand for local library services would be less than under the Project. Although this Alternative would result in a substantial direct and indirect population increase within the Bayview neighborhood, library branches serving the Project site, including the Portola, Visitacion Valley, and the Bayview branches would continue to meet the demands of the community. In addition to the three library branches serving Alternative 4, the proposed development would include space dedicated to library services to supplement the Bayview branch library. As part of Alternative 4, a 1,500-gsf reading room and automated book-lending machines would be integrated into the community retail and public facilities uses. The SFPL branches, and the dedication of space to accommodate library services on the Project site in order to supplement SFPL branches, would accommodate increased demand from development under this Alternative. No additional library facilities would be required to accommodate development of Alternative 4. Therefore, no new or physically altered library facilities would be required in order to maintain acceptable service ratios and this impact is considered less than significant for development under Alternative 4.

Recreation

- Implementation of Alternative 4 would include parks and open space areas similar to the Project and the same State Parks land agreement, which would result in improvements to the CPSRA. Construction activities associated with the proposed parks and recreational facilities are considered part of the overall development footprint. Although the amount of construction would be reduced, the construction activities related to this Alternative are similar to the Project, construction impacts anticipated to result from implementation of this Alternative are analyzed throughout the technical sections of this EIR. Such impacts would be temporary and would be mitigated by measures identified in Section III.D, Section III.H, Section III.I, Section III.K, Section III.M, and Section III.N. These measures address construction-related impacts including, but not necessarily limited to, traffic and circulation, air quality, noise, exposure to hazardous material, and soil erosion, which would help reduce potential impacts to recreational resources. Construction impacts associated with development of new parks and recreational facilities would be less than significant.

[1366] For Alternative 4, 7,350 residential units multiplied by 0.203 SFUSD student generation rate would result in 1,492 students.

- At build-out of Alternative 4, the projected population within the Project site would increase from approximately 1,113 residents to approximately 17,126 residents, while employment would increase from 529 jobs to approximately 7,219 jobs. Similar to the Project, parks and open space included in Alternative 4 would provide a ratio of about 20.4 acres of parkland per thousand residents, which is substantially higher than the benchmark ratio of 5.5 acres per thousand residents (refer to Section III.P). A total of 5.9 acres of neighborhood parks would be constructed at Candlestick Point compared to 8.1 acres under the Project. The increase in population and employment could result in an increase in the use of existing parks, recreational facilities, and open space. During a given phase, however, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual, and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed. Parks and open space at HPS Phase II would include improvements similar to the Project and would help offset the increase in demand created by new residents and employees. The 1.4-acre Alice Griffith Neighborhood Park would serve residents of the Alice Griffith Public Housing site. The impact would be less than significant, the same as for the Project.

  The high-frequency BRT route around Yosemite Slough, rather than over the slough on the Yosemite Slough bridge as proposed under the Project, presents more at-grade bicycle and pedestrian conflicts for residents of the Bayview District seeking access to the slough and the Bay Trail. In the Project, the BRT is physically separated from the Bay Trail and connecting bicycle/pedestrian trails, eliminating crossing conflicts between the Bay Trail and the Bayview. This is a potentially significant impact that would not occur under the Project.

  A windsurfing launch site is located in the CPSRA. Windsurfing could potentially be impacted by the construction of tall structures in close proximity to the Bay that affect wind patterns and direction. Similar to the Project, development under Alternative 4 would include structures above 100 feet in height. Alternative 4 would include seven towers at Candlestick Point, compared to eleven towers with the Project, and the average tower height would be similar under Alternative 4. Compared to the Project, three towers would be removed from the Candlestick Point North district, one tower would be removed from the Candlestick Point South district, and the stadium would not be constructed. Therefore, due to the reduced number of towers and building heights, impacts to windsurfing would be less than significant, and less than the Project.

Utilities

Water Supply

Alternative 4 would include water infrastructure similar to the Project. Impacts of construction activities associated with this infrastructure, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of water conveyance or treatment infrastructure associated with the Project. The water required for construction activities is assumed to be supplied by water trucks and/or existing sources. No construction-related impacts associated with the consumption of water would occur with the Alternative 4.

Alternative 4 would include less residential and non-residential development compared to the Project. Alternative 4 would generate a total demand of approximately 1.21 mgd, 0.4 mgd less than the Project. As current water use from existing land uses at the Project site is approximately 0.3 mgd, the net effect of the Alternative 4 on water demand would be an increase of approximately 0.91 mgd.[1367] As stated in the Water Supply Assessment provided for the Project, the SFPUC projects that adequate supply would be available to satisfy all retail demand, including Project-related demand, under normal conditions (refer to Appendix Q1). Therefore, there would be sufficient water supplies to accommodate the water demand of Alternative 4. This is considered to be a less-than-significant impact. Similar to the Project, implementation of Alternative 4 would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant.

Implementation of Alternative 4 would require expansion of the existing off-site AWSS by providing an AWSS loop at Candlestick Point that would connect to the planned extension of the existing off-site AWSS on Gilman Street from Ingalls Street to Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road. Implementation of the identified mitigation measure (MM UT-2) would ensure the provision of adequate water for on-site fire-fighting purposes, and the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements for water to fight fires. The impact is less than significant with implementation of this mitigation measure.

Wastewater

Alternative 4 would discharge a maximum peak flow of 479 gpm to the Candlestick tunnel sewer, which has an existing unused capacity of 28,035 gpm in dry weather. This flow would combine with a maximum peak flow of 1,153 gpm from the HPS Phase II into the Hunters Point tunnel sewer. The total maximum peak Project flows of 1,632 gpm (826 gpm less than the maximum peak flow of the Project) would combine in the Hunters Point tunnel sewer, which has an existing unused capacity of 69,853 gpm in dry weather.[1368] This represents 1.2 percent of the available capacity of the Hunters Point tunnel sewer, which could be accommodated by the existing off-site infrastructure.

The maximum peak flow of wastewater generated under Alternative 4 would be 826 gpm less than the maximum peak flow of the Project. The current remaining treatment capacity of the SWPCP would accommodate the increase in wastewater flows from the development of Alternative 3. Overall flows during wet weather would decrease, indicating that the proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows, assuming completion of utility infrastructure prior to occupancy of Alternative 4. Based on this analysis, the overall volumes in the Bayside system during wet weather would be less than under existing conditions with implementation of the Alternative 4. It is possible that a temporary increase in CSO volume could occur (which could affect the capacity of the SWPCP for treatment) during wet weather, as noted, above. Implementation of the identified mitigation measure (MM UT-3a) would reduce this impact to less than significant by providing

[1367] Water demand for this alternative was estimated by prorating water demand for the Project (presented in Table III.Q-4) based on build-out of Alternative 4.
[1368] Wastewater generation for this alternative was estimated by using the generation rates presented in Table III.Q-5 based on build-out of Alternative 4.

temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for Alternative 4. Thus, Alternative 4 would not result in any net increase in CSO volume in the Bayside system during wet weather. A less-than-significant impact to existing off-site treatment facilities would occur.

Development associated with Alternative 4 would incrementally contribute wastewater during dry and wet-weather events to the Combined Sewer System operated by the SFPUC, but overall, wet-weather volumes would decrease in the Bayside system with construction of the alternative's separate stormwater and wastewater systems. In addition, the maximum peak flow of wastewater generated under Alternative 4 would be 826 gpm less than the maximum peak flow of the Project. Compliance with any applicable permit requirements, as monitored and enforced by the SFPUC, would ensure that Alternative 4 would not exceed the applicable wastewater treatment requirements of the RWQCB. In addition, Alternative 4 would not cause the City to exceed the requirements of the NPDES permit for the reasons previously stated and because the flows during wet weather would actually decline compared to existing flows from the Project site. This impact would be less than significant.

Solid Waste

Demolition of existing facilities within the Project site under Alternative 4 would be similar to the Project. Similar to the Project, some construction and demolition debris would be reused on site, while other materials would be transported off site for separation. Materials that cannot be reused or recycled would be transported to the landfills in the area. With implementation of the identified mitigation measure (MM UT-5a), the Project Applicant would be required to submit a Waste-Diversion Plan demonstrating strategies to divert at least 75 percent of total construction wastes before receiving building permits. This impact would be less than significant.

At current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1369] Under Alternative 4, demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 65 percent of construction waste, as also required by mitigation measure MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of Alternative 4 on solid waste would be further reduced. Under Alternative 4, the only construction and demolition activity at Candlestick Point would occur at the Alice Griffith Public Housing site, the Yosemite Slough bridge approach. The Candlestick Park stadium would not be demolished and substantially less construction waste would be generated. The impact of the construction waste generated by Alternative 4 on the capacity of the Altamont Landfill would be less than significant.

Construction activities, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. The amount of these materials would be that could be disturbed would be less than the Project because the development program would be reduced requiring less construction compared to the Project. Potential hazardous materials exposure associated

[1369] CIWMB, 2009.

with construction of the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 4. Hazardous waste would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur intermittently during the construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes. Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. Contaminated soils may require transportation off site and treatment at authorized TSDs. Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of Alternative 4 would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact.

At full build-out, Alternative 4 would generate approximately 16,208 tons annually when all uses are fully operational and assuming no waste-reduction measures. The amount of solid waste generated under Alternative 4 would be 5,619 tons less than the Project because the development program would be reduced. Solid waste generated under Alternative 4 would represent approximately 2.7 percent (compared to 3.7 percent under the Project) of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons).[1370] All residents and businesses of Alternative 4 would be required to comply with the City's mandatory recycling and composting ordinance. In addition, consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant would prepare a Site Waste Management Plan as required by the identified mitigation measure (MM UT-7a.1) that would specify the methods by which the Alternative 4 would divert operational solid waste to assist the City in achieving its diversion goals. The impact of operational solid waste generated by Alternative 4 on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant.

Nearly all uses under Alternative 4 would involve the routine use of hazardous materials at varying levels that would require disposal. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this time. The use of hazardous materials would be less than the Project because the development program would be reduced. The minimal amount of hazardous waste that would be generated by Alternative 4 could be accommodated by existing TSD facilities. Similar to the Project, this impact would be less than significant.

Electricity, Natural Gas, and Telecommunications

The proposed utility infrastructure improvements for Alternative 4 would include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications, the same as for the Project. This alternative would not include the new stadium, marina, or the Yosemite Slough bridge. As the development would be smaller than the Project, less electricity, natural gas, and telecommunications serves would be required. Infrastructure expansion would not be as extensive as required for the Project. However, these differences between Alternative 4 and the Project would not substantially affect the infrastructure plan as presented for the Project and, therefore, impacts would be the same as for the Project, and less than significant.

[1370] Solid waste generation for this alternative was estimated using the solid waste generation rates presented in Table III.Q-8.

Energy

Construction activities associated with implementation of Alternative 4 would require energy sources including electricity, diesel, and gasoline. Similar to the Project, the construction activities for Alternative 4 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy and would be subject to requirements to minimize wasteful fuel consumption. Energy use during the construction period would be similar to the Project but reduced because approximately 30 percent fewer residential units and non-residential space would be developed and construction of the Yosemite Slough bridge, stadium, and marina would not occur. Furthermore, given the type of development proposed under this alternative, the energy demand created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related energy use associated with development under Alternative 4 would be considered less than significant.

Implementation of Alternative 4 would result in baseline electricity consumption substantially less than the Project, because the overall development program (residential and most non-residential uses) would be reduced by approximately 30 percent. In addition, Alternative 4 would include the energy savings associated with the Project Applicant's commitments to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project, those efficiency measures would result in consumption of at least 5.4 percent less electricity than a project that would not implement such measures. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts of Alternative 4 to less than significant.

Implementation of Alternative 4 would result in baseline natural gas consumption substantially less than the Project, because the overall development program (residential and most non-residential uses) would be reduced by approximately 30 percent. In addition, Alternative 4 would include efficiency measures similar to the Project resulting in the use of approximately 13 percent less natural gas than a development project without such measures. Those efficiency measures would result in consumption of at least 13 percent less natural gas than a development project without such measures. In addition, the Project Applicant would also implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity; the use of solar thermal energy to provide space cooling with the use of absorption systems; and/or water for space heating and domestic water systems. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential natural gas consumption impacts to a less-

than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts Alternative 4 to less than significant.

Alternative 4 would increase trips to and from the Project site, increasing the use of petroleum fuels. Similar to the Project, fuel consumption resulting from travel to and from the Project site would be five times higher than under existing conditions, indicating a large increase in consumption, although it would be less than the Project due to the 30 percent reduction in residential units. However, this consumption would not be wasteful because (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. However, Alternative 4 lacks the direct, grade-separated BRT connection between Candlestick Point and HPS Phase II that the Yosemite Slough bridge would provide in the Project. This would result in an estimated delay of up to 7 minutes in transit travel times, which would result in fewer transit trips and more automobile trips and an increase in consumption of energy. Similarly, reductions in walking and bicycle trips between Candlestick Point and HPS Phase II that would be accommodated on the Project's bridge could result in increased drive trips and energy use.

Nevertheless, these reductions in transit, bicycle, and pedestrian trips and resulting increases in automobile trips would not likely create a significant energy consumption impact when compared to the Project. Therefore, similar to the Project, Alternative 4 would not be wasteful with respect to petroleum fuel consumption, and impacts are considered less than significant.

Greenhouse Gas Emissions

Similar to the Project, construction activities associated with implementation of Alternative 4 would emit GHGs associated with diesel and gasoline consumption. Similar to the Project, the construction activities for Alternative 4 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not be a prolonged source of GHG emissions. GHG emissions during the construction period would be similar to the Project but reduced because approximately 30 percent fewer residential units and non-residential space would be developed and construction of the Yosemite Slough bridge, stadium, and marina would not occur. Therefore, construction-related GHG emissions and climate change impacts associated with development under Alternative 4 would be considered less than significant.

Implementation of Alternative 4 would result in baseline GHG emissions substantially less than the Project, because the overall development program (residential and most non-residential uses) would be reduced by approximately 30 percent. In addition, Alternative 4 would include the GHG emission savings associated with mitigation measures, including MM GC-1 through MM GC-4, which require the implementation of the Project Applicant's conceptual commitments to (1) reduce energy use to 15 percent

below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*.

Similar to the Project, Alternative 4 would increase trips to and from the Project site, increasing the use of petroleum fuels. Similar to the Project, fuel consumption resulting from travel to and from the Project site would be five times higher than under existing conditions, indicating a large increase in consumption, although it would be less than the Project due to the 30 percent reduction in residential units. However, this Alternative would also include the Project Applicant's commitment to reduce transportation related GHG emissions: (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. These programs would be similar to the Project, but would not be as effective because the entire transportation system proposed under the Project may not be developed. The transportation system and TDM programs were designed to work for development of Candlestick Point and HPS Phase II as proposed under the Project. Efficiencies of the system would be reduced compared to the Project. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel.

However, Alternative 4 lacks the direct, grade-separated BRT connection between Candlestick Point and HPS Phase II that the Yosemite Slough bridge would provide in the Project. This would result in an estimated delay of up to 7 minutes in transit travel times, which would result in fewer transit trips and more automobile trips and an increase in consumption of energy. Similarly, reductions in walking and bicycle trips between Candlestick Point and HPS Phase II that would be accommodated on the Project's bridge could result in increased drive trips and energy use.

Nevertheless, these reductions in transit, bicycle, and pedestrian trips and resulting increases in automobile trips would not likely create a significant energy consumption impact when compared to the Project. Similar to the Project, Alternative 4 would not be wasteful with respect to petroleum fuel consumption. Thus, GHG emissions at the Project site under development of Alternative 4 would not inhibit the achievement of the goals of AB 32 or the SFCAP. Similar to the Project, GHG emissions and climate change impacts would be less than significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The

BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for Alternative 4 and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO2e per service population per year and would result in a less-than-significant impact on climate change. Alternative 4 would reduce a similar mix of land use proposed with the Project; however, Alternative 4 would decrease the housing density and alter the service population which would impact the amount of GHG emissions per service population. Without a quantitative analysis, the comparison to the BAAQMD threshold cannot be judged, and Alternative 4 may not be below the proposed threshold.

Attainment of Project Objectives

Alternative 4 would fail to meet several of the Project objectives because it would include a reduced development program, including a 30 percent reduction in residential and most non-residential uses, no State Lands agreement, no development of the Yosemite Slough bridge or stadium, and no development of the marina compared to the Project. Refer to Table VI-8 (Attainment of Project Objectives Alternative 4) below for a discussion of each objective.

Table VI-8 Attainment of Project Objectives Alternative 4

Objective	*Meets Project Objective?*	*Analysis*
1. The integrated development should produce tangible community benefits for the Bayview and the City.	Y-	Alternative 4 would include opportunities for job and economic development. However, compared to the Project, such opportunities would be reduced because most of the employment-generating uses would be reduced by 30 percent. There would be no grade-separated, direct transit connection between Candlestick Point and HPS Phase II. In addition, it would include substantially less parks and open space amenities compared to the Project. Alternative 4 would not meet this objective to the same extent as the Project.
2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger Bayview neighborhood and should maintain the character of the Bayview for its existing residents.	Y-	The proposed mix of uses and urban design concepts would provide a direct physical, visual, and architectural connection to the Bayview neighborhood and City. This alternative also includes extension of the transportation network into the Project site, particularly for transit. Those connections would allow residents of the Bayview neighborhood and City to access the commercial, cultural, and institutional opportunities at the Project site. The Alternative 4 development program would be reduced compared to the Project. Therefore, Alternative 4 would not meet this objective to the same extent as the Project.
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourage the rebuilding of Alice Griffith Housing.	Y-	Alternative 4 would include a variety of unit types, sizes, and structures, and a wide range of affordability levels. This alternative would include the redevelopment of the Alice Griffith Public Housing site. However, overall there would be a reduced amount of affordable housing units developed under Alternative 4, because the residential development would be reduced by 30 percent. Therefore, Alternative 4 would not meet this objective to the same extent as the Project.
4. The integrated development should incorporate environmental sustainability concepts and practices.	Y	Although the overall development program would be reduced, Alternative 4 would include similar sustainability principles compared to the Project. Therefore, Alternative 4 would meet this Project objective.
5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure.	N	Alternative 4 would not construct a new stadium for the 49ers. Therefore, Alternative 4 would not meet this Project objective.
6. The integrated development should be fiscally prudent, with or without a new stadium.	Y-	Development of Alternative 4 would increase sales tax revenue to the City. However, the amount of sales tax generating use would be less than the Project and would meet this objective to a lesser extent than the Project. Alternative 4 would include a development program that would encourage substantial private capital investment. The overall development program would be reduced and Alternative 4 would meet this objective to a lesser extent than the Project.

Y = Alternative does meet Project objective.
Y- = Alternative meets Project objective, but to a lesser extent than the Project.
Y– = Alternative meets Project objective, but to a significantly lesser extent than the Project.
N = Alternative does not meet Project objective.

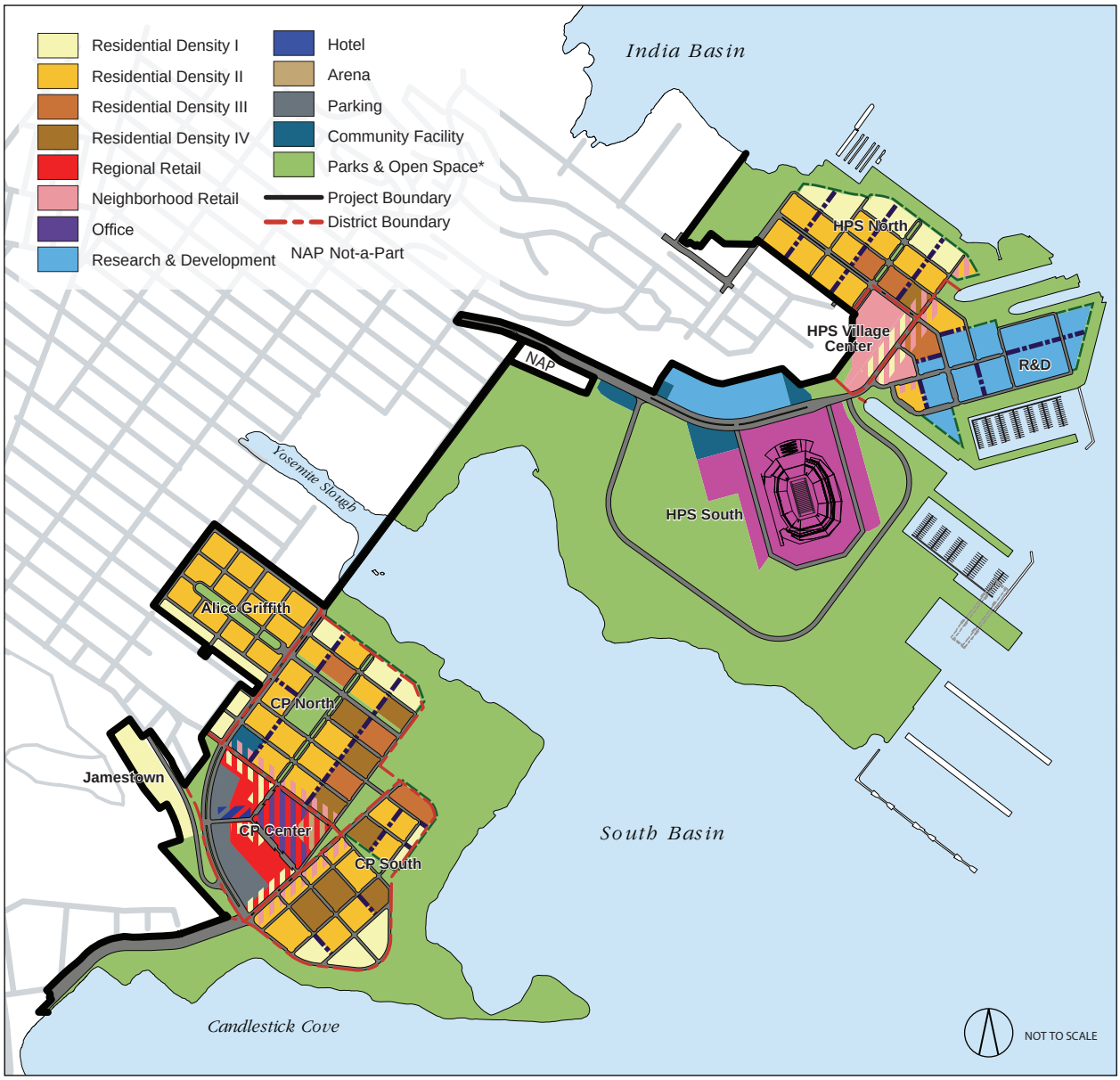
VI.C.4a Subalternative 4A: CP-HPS Phase II Development Plan with Historic Preservation

Alternative 4 (Reduced CP-HPS Phase II Development; Historic Preservation; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge) analyzes a reduced-development alternative while preserving the five historic structures (Buildings 208, 211, 224, 231, and 253) that are part of the California Register of Historical Resources (CRHR)-eligible Hunters Point Commercial Drydock and Naval Shipyard Historic District. Subalternative 4A includes the Project's full land use program and the historic preservation component of Alternative 4. Refer to Figure VI-3a (Subalternative 4A Land Use Plan) for an illustration of the proposed Subalternative 4A land use plan.

This subalternative, like the Project, would retain Drydocks 2 and 3 and four buildings (Buildings 140, 204, 205, and 207) previously identified as historic resources in National Register of Historic Places (NRHP)-eligible Hunters Point Commercial Drydock Historic District, This subalternative and the Project would also retain Drydock 4, considered individually eligible for the NRHP, and Building 208, part of the CRHR-eligible historic district. Like Alternative 4, Subalternative 4A would retain Buildings 208, 211, 224, 231, and 253. Building 208 would be mothballed, the same as under the Project. Buildings 211, 231, and 253 would be rehabilitated under the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (Secretary's Standards) to accommodate approximately 338,000 gsf of R&D and 1,000 parking spaces. The rehabilitation would occur generally as recommended by Page & Turnbull's *Hunters Point Shipyard Feasibility Study* (July 1, 2009, included in the EIR as part of Appendix J). Total floor area for R&D would remain the same as the Project, i.e., 2,500,000 gsf. Building 231 would be reused for parking. Buildings 211 and 253 would accommodate R&D uses. The feasibility study proposed parking uses for Building 231, to accommodate parking as part of the overall HPS Phase II land use program, and as a use appropriate for the large volume of Building 231. Building 224, the air raid shelter, would be retained as museum space. All mitigation measures for the Project would also be applied to Subalternative 4A except for MM CP-1b.1, which requires documentation of demolished buildings.

Because Subalternative 4A proposes the Project's land use program, except for Impact CR-1b, the impacts identified for the Project would also occur with Subalternative 4A. Preservation of these buildings would change some of the analysis in Aesthetics, Hydrology and Water Quality, and Greenhouse Gas Emissions, but not the impact conclusions in these sections. The impacts and analysis identified for the Project in the following issue areas would be the same for Subalternative 4A as identified for the Project:

- Land Use and Plans
- Population, Housing, and Employment
- Transportation and Circulation
- Air Quality
- Noise
- Paleontological Resources
- Hazards and Hazardous Materials
- Geology and Soils
- Hydrology and Water Quality (except sea level rise)
- Public Services



SOURCE: Lennar Urban, 2010.

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FIGURE VI-3a

Candlestick Point — Hunters Point Shipyard Phase II EIR

SUBALTERNATIVE 4A LAND USE PLAN

- Recreation
- Utilities
- Energy

The impacts and analysis identified for Alternative 4 in the following issue area would be the same for Subalternative 4A as identified for the Project, as Subalternative proposes the historic preservation component of Alternative 4:

- Cultural Resources

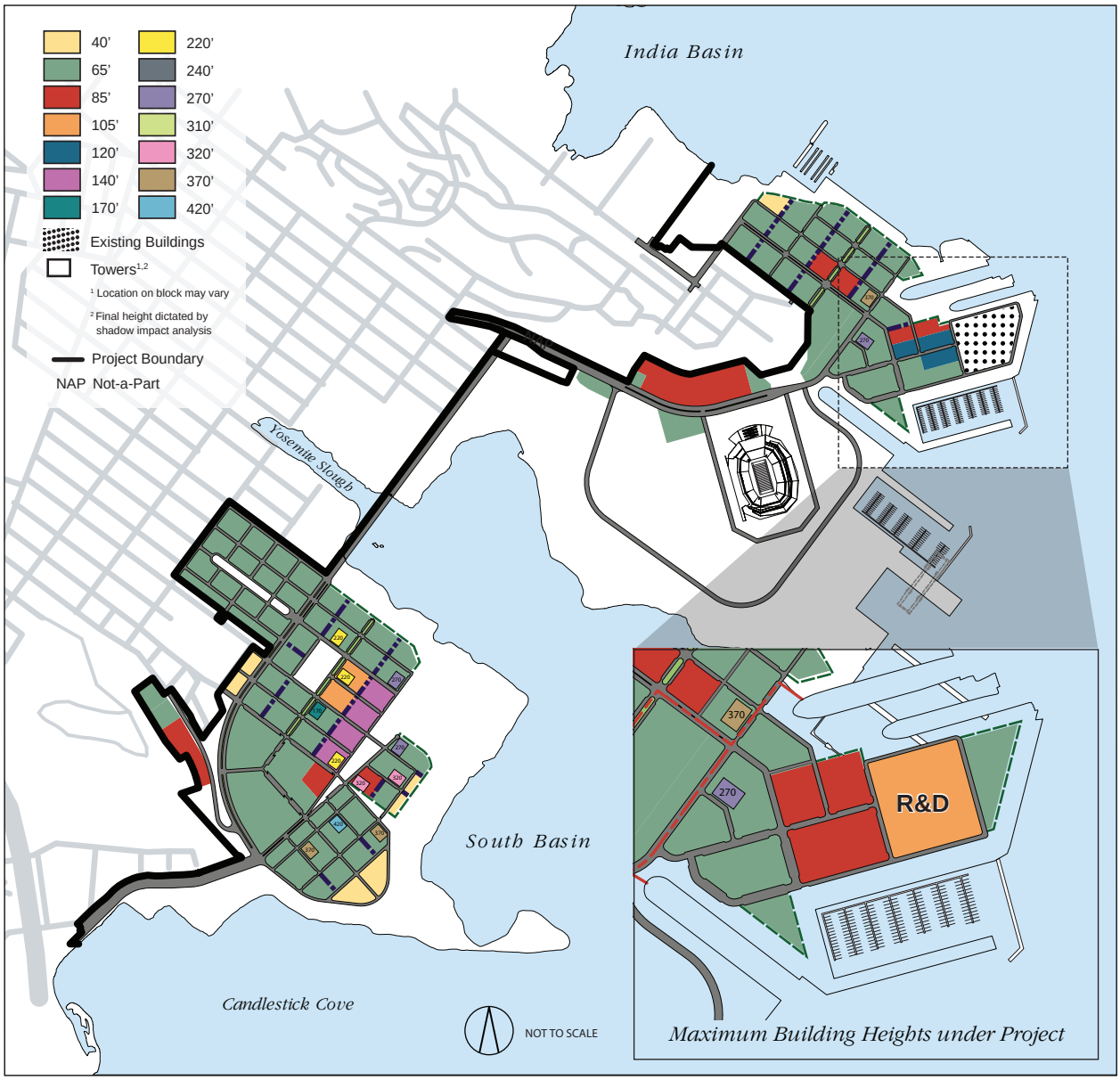
To document that there would be no change with respect to Transportation and Circulation, Air Quality, or Greenhouse Gas Emissions, refer to Appendix T4 (ENVIRON, Updated Air Quality Analysis Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Updated Variants 2A and 3 [Tower Variant D], Alternative 2, and Subalternative 4A, April 26, 2010), Appendix T5 (ENVIRON, Updated Greenhouse Gas Emissions Calculation for Candlestick Point–Hunters Point Shipyard Phase II Development Plan—Variants 2A and 3 [Tower Variant D], Alternative 2, and Subalternative 4A, March 12, 2010), and Appendix T7 (LCW Consulting, CP-HPS Phase II Development Plan Transportation Study—Subalternative 4A, March 15, 2010).

Revised analyses for Aesthetics, Hydrology, and Greenhouse Gases are discussed, below.

Aesthetics

To provide for the same land use program as the Project, the height of some buildings in the R&D District of HPS Phase II would be greater than that analyzed under the Project to accommodate the displaced R&D resulting from preserving Buildings 211, 224, 231, and 253. The structures in the R&D District immediately west of the buildings to be preserved would increase from 85 feet maximum with the Project to 120 feet maximum with Subalternative 4A. Refer to Figure VI-3b (Subalternative 4A Maximum Building Heights) above, showing areas that would have maximum heights of 65 feet, 85 feet, or 120 feet, compared to 65 feet to 105 feet with the Project. For reference, existing Building 211 is about 45 feet in height, Building 231 is about 80 feet, and Building 253 ranges from 70 feet to 122 feet (and to 158 feet at the top of its tower element).

Figure VI-3c (Subalternative 4A View 18a: Southeast from Hilltop Open Space) is a visual simulation of building height and massing of Subalternative 4A from a viewpoint on Hillpoint Park. As noted in this figure, the proposed building heights with Subalternative 4A would still preserve expansive Bay views. From long distances, the change would be relatively unnoticeable, and, thus, would not adversely affect scenic vistas. From mid-range views as identified for the Project, the changes in height would be noticeable, but the residential towers at HPS would remain a predominant feature in the views from and to the north. The scale of development would be similar to other areas of San Francisco, such as parts of downtown or Rincon Hill. Development of Subalternative 4A would provide a continuation of the existing street grid, thereby maintaining existing view corridors to the Bay and East Bay hills. Public access areas, both City and State parks, would maintain views from the Project site toward the East Bay and the Bay. Subalternative 4A would not result in additional tower clustering or other structures that would substantially obstruct, alter, or degrade the quality of views of the Bay or beyond from any long-range viewpoints. Views of Bayview Hill and Hunters



SOURCE: Lennar Urban, 2010.

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FIGURE VI-3b

Candlestick Point — Hunters Point Shipyard Phase II EIR

SUBALTERNATIVE 4A MAXIMUM BUILDING HEIGHTS

Existing

Proposed

SOURCE: Lennar Urban, 2010.

PBS&J 04.19.10 02056 | JCS | 10

FIGURE VI-3c

Candlestick Point — Hunters Point Shipyard Phase II EIR

SUBALTERNATIVE 4A
VIEW 18a: SOUTHEAST FROM HILLTOP OPEN SPACE

Point Hill from the East Bay would be partially obstructed from Alameda and the Oakland area by Subalternative 4A structures; however, the amount of the obstruction would be minimal and not considered to be significant because of the distance across the Bay. Subalternative 4A development would not obstruct, alter, or degrade the quality of any existing views of the site from these locations. The impact on scenic vistas would remain less than significant, the same as for the Project.

With regard to impacts on scenic resources such as the Yosemite Slough, the Re-gunning crane, Double Rock, Bayview Hill, and Hunters Point Hill, the somewhat taller building heights in the R&D District are far from all of these features except the gantry crane and Hunters Point Hill. Hunters Point Hill is a prominent scenic resource west of the HPS Phase II site and would remain intact with development of Subalternative 4A. Views of Bayview Hill would not be significantly obstructed by Subalternative 4A development in HPS Phase II except from close-in vantage points. Subalternative 4A would retain structures in the CRHR-eligible Hunters Point Commercial Drydock and Naval Shipyard Historic District, as well as the Re-gunning crane, a highly visible feature. The Re-gunning crane is so large and visible that an increase in some building heights of 35 feet at the center of the R&D District would have no discernable impact on this visual resource. Development of the HPS Phase II site would also include about 240 acres of new and renovated parkland with improved public access, thereby improving the scenic quality of the area. The proposed shoreline improvements and construction of the new marina would improve the aesthetic quality of the shoreline along HPS Phase II, reducing erosion, including marsh plantings where appropriate, and removing debris. These improvements would represent a beneficial impact of the development, improving the overall visual character of the shoreline.

The CRHR-eligible historic district as part of Subalternative 4A would be bounded by new R&D development to the west and by the shoreline areas of HPS and San Francisco Bay to the north and south. Structures in the historic district, including Buildings 208, 211, 224, 231, and 253, are large-scale industrial buildings ranging from 45 feet to 122 feet, with part of Building 253 rising to 158 feet. While R&D development up to 120 feet in height would be a different design than most of the existing structures in the historic district, that new development would not alter the visual setting of the historic district such that its integrity would be impaired. In addition, the historic district would retain its waterfront setting, including the drydocks. Therefore, development at the HPS Phase II site under Subalternative 4A, as for the Project, would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting, and the impact would be less than significant. No mitigation is required.

The height modifications in the R&D District under Subalternative 4A would not increase any impacts to visual character. The towers to be developed on HPS Phase II would remain the predominant visual element in terms of buildings, and the additional heights of some of the R&D buildings would not affect the planned urban character of the site. Subalternative 4A would replace deteriorating structures, vacant parcels, expanses of asphalt and dirt, and piles of rubble and debris with a high-quality environment that would include a variety of architectural styles and open space. Therefore, Subalternative 4A, in replacing existing uses and structures, and in light of the analysis of changes in visual conditions presented throughout Section III.E (Aesthetics) of the EIR, would not substantially degrade the visual quality or character of the HPS Phase II site or its surroundings and the impact would be less than significant. No mitigation is required.

The wave protection berm for the historic district and the grade change from the remainder of HPS development would result in a "step-down" effect from the western portions of the R&D District to this area. The resulting visual change would be less than significant.

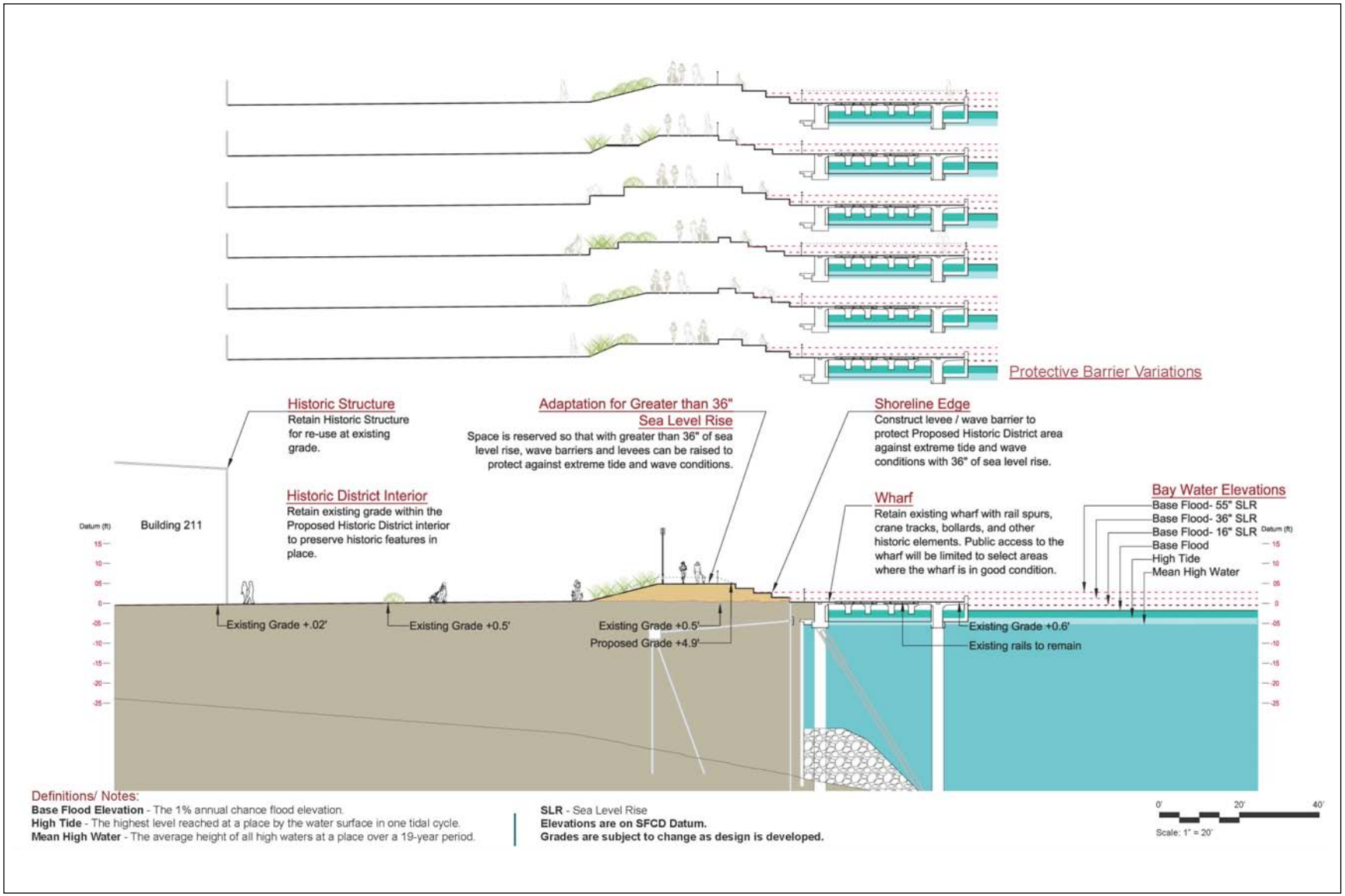
The wave protection berm would alter the view of visitors and employees in the area of the rehabilitated buildings toward the Bay, but since the berm is only 3 feet high, it would not block views. The Bay Trail would be located on top of this berm in some areas, and outside the berm in others. Refer to Figure VI-3d (Subalternative 4A: Conceptual Berm Design for Historic Preservation Area) for a conceptual drawing of the proposed berm. The impacts would be less than significant, the same as for the Project.

Hydrology and Water Quality (Sea Level Rise)

To address sea level rise, Alternative 4 would raise the grade at the site of Buildings 208, 211, 224, 231, and 253 to match the grade on the remainder of the development at HPS Phase II, i.e., 3.5 feet above the Base Flood Elevation, as required by mitigation measure MM HY-12a.1. Subalternative 4A, instead, would maintain the existing grade at the site of Buildings 208, 211, 224, 231, and 253, allowing railroad spurs and other historic elements such as bollards, to remain. To protect the historic district from potential sea level rise, a wave protection berm would be constructed around the eligible historic district to accommodate a 36-inch sea level rise, on top of which the Bay Trail would be constructed. The remainder of the site would be graded in accordance with MM HY-12a.1. The impact would be less than significant, the same as for the Project.

Greenhouse Gas Emissions

Implementation of Subalternative 4A would result in baseline GHG emissions similar to the Project and would include the GHG emission reductions associated with mitigation measures, including MM GC-1 through MM GC-4, which require the implementation of the Project Applicant's conceptual commitments to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This subalternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. The existing building space may not be as energy efficient as newly built structures. Therefore, there may be a slight increase in GHG emissions compared to the Project due to this small amount of R&D building space that is contained in the historic buildings. Otherwise, there would be no difference in the greenhouse gas emissions impacts of Subalternative 4A compared to the Project.



SOURCE: RHAA, 2010.

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FIGURE VI-3d

Candlestick Point — Hunters Point Shipyard Phase II EIR

SUBALTERNATIVE 4A: CONCEPTUAL BERM DESIGN FOR HISTORIC PRESERVATION AREA

VI.C.5 Alternative 5: Reduced CP-HPS Phase II Development; No HPS Phase II Stadium, State Parks Agreement, or Yosemite Slough Bridge

Summarized Description

Alternative 5 would have the same overall land use program as the Project. The total number of housing units would be the same as for the Project. However, approximately 1,350 units would be shifted from Candlestick Point to HPS Phase II, because no State Parks agreement would occur, resulting in a smaller development footprint at Candlestick Point. No Yosemite Slough bridge would be constructed and there would be no stadium at HPS Phase II.

Table VI-9 (Comparison of Alternative 5 and Project Build-Out) provides a comparison of the uses proposed in the Project area under the Project and Alternative 5. Figure VI-4 (Alternative 5 Land Use Plan) illustrates the land use plan for Alternative 5.

Detailed Description

Candlestick Point

Alternative 5 would retain the existing configuration of the State Park boundary, and would not include improvements or ongoing funding for operations and maintenance as provided by the Project. As a result, the land area available for development at Candlestick Point would be smaller and 1,350 housing units would be shifted to HPS Phase II. A total of 6,500 residential units would be constructed at Candlestick Point with higher densities, resulting in more mid-rise structures and towers than under the Project. The amount of retail, office, community service, hotel, arena uses would remain as proposed under the Project.

HPS Phase II

Research and development uses, neighborhood retail, community-serving uses, the artists' studios, and marina proposed by the Project are also proposed under Alternative 5. Residential development would increase by 1,350 units, for a total of 4,000 units. The San Francisco 49ers football stadium would not be constructed at HPS Phase II.

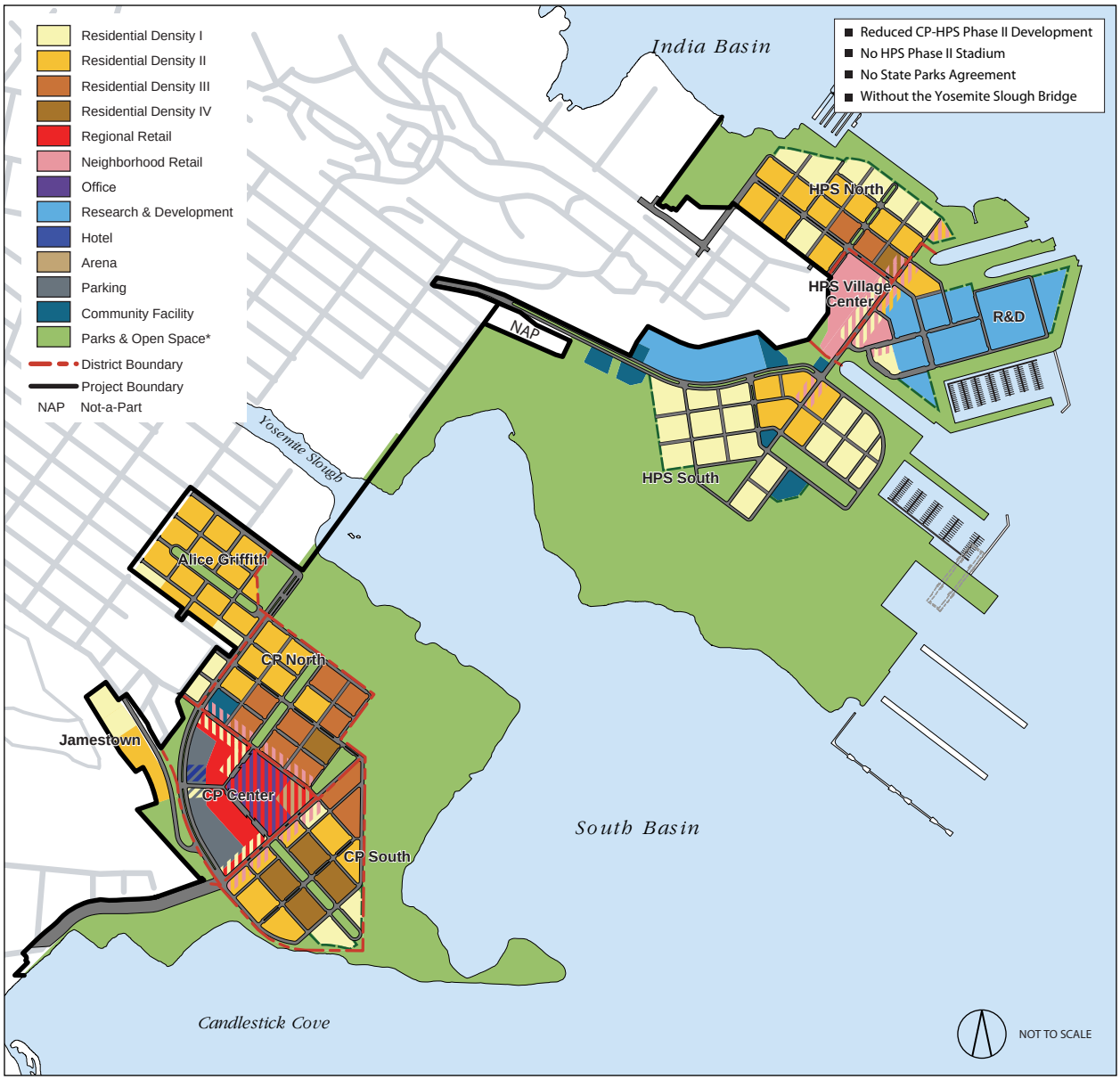
Transportation and Circulation (without Yosemite Slough Bridge)

Under Alternative 5, motorized and non-motorized traffic, including BRT, would be required to circumnavigate Yosemite Slough. The circulation network around Yosemite Slough would be the same as Alternatives 2 and 4, as illustrated in Figure VI-1. The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

Table VI-9 Comparison of Alternative 5 and Project Build-Out

Use	*Alternative 5*	*Project*	*Comparison to Project*
Candlestick Point			
Residential (units)	6,500	7,850	-1,350
Retail (gsf):			
Regional Retail	635,000	635,000	0
Neighborhood Retail	125,000	125,000	0
Community Services	50,000	50,000	0
Hotel (gsf)	150,000	150,000	0
Office (gsf)	150,000	150,000	0
10,000-seat Arena (gsf)	75,000	75,000	0
Football stadium (seats)	70,000 (existing)	0	70,000
HPS Phase II			
Residential (units)	4,000	2,650	1,350
Neighborhood Retail (gross square feet - gsf)	125,000	125,000	0
Research & Development (gsf)	2,500,000	2,500,000	0
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	30,000	30,000	0
Community Services	50,000	50,000	0
Football Stadium (seats)	0	69,000	-69,000
Marina (slips)	300	300	0
Totals			
Residential (units)	10,500	10,500	0
Retail (gsf)	885,000	885,000	0
Community Services	100,000	100,000	0
Research & Development (gsf)	2,500,000	2,500,000	0
Artists' Studios (gsf):			
1:1 Studio Renovation & Replacement	225,000	225,000	0
New Artist Center (net gsf)	30,000	30,000	0
Other Elements			
Yosemite Slough bridge	No	Yes	—
Shoreline Improvements	Yes	Yes	—
State Park Agreement/total acres of State Parkland	No/120.2	Yes/96.7	+23.5

SOURCE: Lennar Urban, PBS&J, 2009.



SOURCE: Lennar Urban, 2009.

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FIGURE VI-4

Candlestick Point — Hunters Point Shipyard Phase II EIR

ALTERNATIVE 5 LAND USE PLAN

Between the intersection of Carroll Avenue/Arelious Walker Drive and Crisp Road within HPS Phase II, the proposed BRT line would be routed on Carroll Avenue between Arelious Walker Drive and Hawes Street; on Hawes Street between Carroll Avenue and Armstrong Avenue (currently unimproved); and on Armstrong Avenue between Hawes Street and the Navy rail right-of-way; along the Navy rail right-of-way between Armstrong Avenue and Shafter Avenue; along Shafter Avenue between the Navy rail right-of-way and Arelious Walker Drive; and on Arelious Walker Drive between Shafter Avenue and Crisp Road (currently unimproved).

On Carroll Avenue, Hawes Street, and Armstrong Avenue to the Navy rail right-of-way the BRT line would operate within an exclusive BRT lane, one of the two travel lanes in each direction would be transit-only. Hawes Avenue between Carroll Avenue and Armstrong Avenue, and Arelious Walker Drive between Shafter Avenue and Crisp Road are currently unimproved streets and would be built out to accommodate one transit-only travel lane in each direction. The Navy rail right-of-way between Armstrong Avenue and Shafter Avenue would be improved to provide one transit-only travel lane in each direction. Shafter Avenue between the rail right-of-way and Arelious Walker Drive would be reconfigured to provide four travel lanes, with BRT operating in the center lanes.

Basis for Impact Analysis

For the Project, the potential impacts are generally based on the parameters of the Project, which include the size, bulk, and type of development, the footprint of development, and the number of residents, employees, and visitors to the Project site. For Alternative 5, the impacts of the Project are compared to the impacts of a similar development program, except for the following:

- No State Parks land agreement
- The Yosemite Slough bridge would not be constructed
- The San Francisco 49ers stadium at HPS Phase II would not be constructed. Instead, the same number of residential and retail units as the Project, as well as the same square footages of these uses as the Project, would be constructed on this site, plus 1,350 residential units would be shifted from Candlestick Point to HPS Phase II

Without a State Parks land agreement, there would be no established funding mechanism for future maintenance of the parks on site. Additionally, 23.5 acres of State Parks land would not be available for development at Candlestick Point compared to the Project. Therefore, as a result of not executing the State Parks land agreement, and keeping the overall development program under Alternative 5 the same as that of the Project, the density of development would increase within the overall Project site due to a decrease in available land for development.

With the shift of residential units, the footprint of development at HPS Phase II would be larger in comparison to the Project, and accordingly, the footprint of development at Candlestick Point would be reduced in comparison to the Project. The build-out of all residential and non-residential uses under Alternative 5 would be the same as the Project.

Potential Impacts

Land Use and Plans

Implementation of Alternative 5 would not be expected to divide an established community because it would include infill development, centered on nodes of commercial and retail activity at Candlestick Point and HPS Phase II with no physical division of an established community, the same as for the Project. As with the Project, residential and non-residential infill around these nodes of activity would provide a continuous land use pattern and street grid, provide new services and community amenities in the Bayview Hunters Point neighborhood, allow better access to parks and recreational facilities (which would be improved under Alternative 5), and remove existing barriers to circulation and access over existing conditions. The upland transportation routes for automobile and BRT routes would follow existing streets and railroad right-of-way in the South Basin industrial area surrounding Yosemite Slough. The South Basin industrial area contains a variety of small-scale industrial uses, such as auto repair shops, food distributors, bulk warehouses, and recycling facilities. The area also includes many vacant and underutilized lots. The upland transportation routes would generally run along the southeastern edge of the South Basin industrial area, and not through an established community. Therefore, development under Alternative 5 would not divide an established community and no impact would occur.

Implementation of Alternative 5 would require amendments similar to the Project for the following planning documents: *City of San Francisco General Plan*, *Bayview Hunters Point Redevelopment Plan*, *Hunters Point Shipyard Redevelopment Plan*, Bay Plan, and *San Francisco Bay Area Seaport Plan*. An amendment to the *CPSRA General Plan* would not be required because there would no State Parks land agreement. However, with implementation of the requirements and mitigation measures identified for the Project in Section III.C through Section III.S of this EIR, development under Alternative 5 would not conflict with any applicable land use plans, policies, or regulations (of an agency with jurisdiction) adopted for the purpose of avoiding or mitigating an environmental effect. Furthermore, development under this Alternative would not conflict with any of the policies, goals, and strategies analyzed for the Project. Although the Project is consistent with the Bay Plan polices with regards to Bay fill, it should be noted that development under Alternative 5 would reduce the amount of Bay fill compared to the Project, because the Yosemite Slough bridge would not be constructed. There is no Bay fill associated with construction of the stadium; therefore, the lack of a stadium under Alternative 5 would not lessen impacts to Bay fill in comparison to the Project. Similar to the Project, this impact would be less than significant.

Implementation of Alternative 5 would not result in a substantial adverse change in the existing land use character. Development under Alternative 5 would substantially change the character of the site from open space and industrial uses to an urbanized area representative of other areas in San Francisco. This change would improve deteriorated conditions and connectivity, as well as provide numerous areas of open space, extensive landscaped areas, pleasing architecture, and shoreline improvements, all of which would improve the character of the site. Furthermore, without construction of the Yosemite Slough bridge and San Francisco 49ers stadium, changes to the existing land use character would be less than those created by the Project. Therefore, changes resulting from development under Alternative 5 would not be considered adverse changes. Furthermore, the transition in scale between adjacent neighborhoods and development under this Alternative, as well as the varied range of proposed uses, would not result in a substantial adverse change in the existing land use character of the Project area. Similar to the Project, this impact would be less than significant.

Without a State Parks land agreement, there would be no changes to State Parks land use within the Project site; State Parks land would not be used for development. Therefore, there would be no impacts to the land use character of State Parks, which would less than the Project.

Population, Housing, and Employment

Construction activities associated with implementation of Alternative 5 would induce direct job growth at the site. The number of construction workers that would be employed during the construction period would be similar to the Project but slightly reduced because construction of the Yosemite Slough bridge and San Francisco 49ers stadium would not occur. It is anticipated that construction employees would commute from elsewhere in the region, rather than relocate to the Bayview Hunters Point neighborhood for a temporary construction assignment. Thus, construction under this Alternative would not generate a substantial, unplanned population increase. Direct and indirect impacts associated with construction employment would be less than significant.

Implementation of Alternative 5 would induce direct and indirect population growth, but this growth would not be considered substantial. Similar to the Project, development under this Alternative would result in a total of 10,500 residential units. Total employment generated under Alternative 5 would be slightly reduced compared to the Project site because the San Francisco 49ers stadium would not be constructed. All other employment-generating uses would be the same as the Project. Employment growth generated by development under this Alternative would result in a similar demand for housing units, which would be less than the total number of new housing units (10,500) that would be provided. The jobs and housing units that would be provided at the site would be closely balanced (approximately 10,730 jobs and 10,500 housing units) so that neither a surplus of housing nor jobs would occur, resulting in indirect residential or employment growth. As a result, similar to the Project, the population and employment increase associated with development under Alternative 5 would not be substantial. This impact is considered less than significant.

This Alternative would demolish and replace 256 units at the Alice Griffith Public Housing site. There are currently no other housing units or residents at the Candlestick Point or HPS Phase II sites. Redevelopment of the Alice Griffith site would occur in phases and would, therefore, not displace substantial numbers of existing residents. The phasing of development under Alternative 5 would be different than the Project because there would be no State Parks land agreement. Under the Project, the phasing of the Alice Griffith district would occur on State Park lands. Under Alternative 5, the initial phases would develop current vacant portions of the Alice Griffith site on Candlestick Point North districts, and existing residents would then occupy public housing replacement units before existing structures are demolished in subsequent phases. Therefore, impacts associated with displacement of housing units and residents with development under Alternative 5 are considered less than significant.

Transportation and Circulation

Alternative 5 would not develop a football stadium; there would be no Yosemite Slough bridge. The remaining Alternative 5 land use program would be the same as with the Project.

The Transportation Study analyzed Alternative 5 and conclusions from the Transportation Study are presented below.

Construction Impacts

Construction activities associated with Alternative 5 would be similar to effects with the Project. Localized construction-related traffic impacts would remain significant and unavoidable.

Intersection Conditions

Alternative 5 would have similar project and cumulative effects at the study intersections. Section III.D discusses traffic effects at those intersections, and the feasibility of mitigation measures. In general, intersection conditions would be significant and unavoidable effects of Alternative 5. Game day traffic conditions with a football stadium would not occur.

Freeway Conditions

Alternative 5 freeway mainline sections effects, freeway ramp junctions conditions, and ramp queuing effects would generally be similar to the Project conditions. Freeway impacts with Alternative 5 would be significant and unavoidable.

Transit Impacts

Alternative 5 transit conditions assume implementation of Project-related transit improvements. Alternative 5 would have a less than significant impact on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with Alternative 5 would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. As concluded in Section III.D, the transit delay effects would remain significant and unavoidable. During the AM and PM peak hour, Alternative 5 would require up to 28 additional vehicles, the same as with the Project.

Bicycle Impacts

The Alternative 5 bicycle trips would be accommodated within the proposed street and network, although there would not be a Yosemite Slough bicycle and pedestrian route; impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The Alternative 5 pedestrian trips would be accommodated within the proposed sidewalk and pedestrian network, although there would not be a Yosemite Slough bicycle and pedestrian route; impacts on pedestrian circulation would be less than significant.

Parking Impacts

Alternative 5 would result in a demand for about 21,310 spaces, compared with a maximum permitted supply of about 16,624 spaces; therefore, the maximum off-street parking supply would be about 4,685 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential

areas. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Alternative 5 impacts on parking would be less than significant.

This alternative would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

Construction activities associated with implementation of Alternative 5 would occur during the same 19-year build-out period and involve the same activities as the Project. Like the Project, those activities would be visible to surrounding land uses and could impact views of scenic vistas and scenic resources in the area. However, any impacts to views would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Because there would be less overall construction with this alternative compared to the Project, impacts to scenic vistas during construction of Alternative 5 would be less than impacts to views of scenic vistas during construction of the Project, although these were identified as less than significant. Construction activities associated with Alternative 5 would have a less-than-significant impact on scenic vistas.

The Yosemite Slough bridge and San Francisco 49ers stadium would not be constructed as part of Alternative 5, and temporary impacts to the slough as a scenic resource would be avoided. There are no adverse impacts, temporary or permanent, on any other identified scenic resource on the Project site as a result of construction activities. The impact would be less than significant, similar to the Project.

As with the Project, construction activities for Alternative 5 would result in exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates that would be visible during construction of the utility infrastructure improvements. Although these activities would take place primarily on site, views of the activities could be available from surrounding land uses. As with the Project, implementation of the identified mitigation measure (MM AE-2) would require the Project developer of Alternative 5 to screen construction sites from public view at street level, provide for appropriate staging of construction equipment, and maintain the cleanliness of construction equipment. Furthermore, without the construction of the Yosemite Slough bridge and San Francisco 49ers stadium, the number and duration of construction sites under development of Alternative 5 would be less than the Project. Therefore, construction activities under Alternative 5 would have a less-than-significant impact on the visual character or quality of the site, the same as for the Project.

Construction of Alternative 5 would occur during daylight hours, and, therefore, glare could be created as a result of reflection of sunlight off windows of trucks and other construction materials that have the potential to generate glare (i.e., glass); however, similar to the Project, the glare created by construction activities at the Project site would not be substantial enough to affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the Project site, and would not exceed the level of existing night lighting levels in other urban areas of San Francisco. Furthermore, without the construction of the Yosemite Slough bridge and San

Francisco 49ers stadium, construction activity under development of Alternative 5 would be less than the Project, therefore, creating less potential for glare impacts. In addition, similar to the Project, construction lighting would comply with all City of San Francisco lighting requirements. Therefore, construction activities for development under Alternative 5 would have less-than-significant light and glare impacts, the same as for the Project.

Alternative 5 would include an overall development program similar to the Project, with the exception of the Yosemite Slough bridge, and San Francisco 49ers stadium at the HPS Phase II site, both of which would not be constructed. The State Parks agreement would not be executed, resulting in an increased density of development at Candlestick Point compared to the Project because the development area would smaller. Alternative 5 would include seven towers at Candlestick Point, compared to 11 towers included under the Project, but the average tower height would be greater under Alternative 5 (341 feet compared to 288 feet under the Project). Compared to the Project, there would be three less towers constructed in the Candlestick Point North district and one less towers constructed in the Candlestick Point South district. Development of Alternative 5 would change views from public viewpoints, but would not substantially obstruct any scenic vistas. Overall, development of Candlestick Point would not block publicly accessible views of the Bay or other scenic vistas. The Yosemite Slough bridge as proposed under the Project would not adversely impact long- or short-range views of the Bay or other scenic vistas. Therefore, this Alternative would not substantially reduce impacts to scenic vistas by not including the bridge.

Views of the East Bay and the Bay from the Project site would be maintained within public access areas, as well as at City and State parks located within Candlestick Point. Similarly, development of HPS Phase II would not substantially block views of scenic vistas, including the Bay. Views of the East Bay and the Bay from HPS Phase II would be maintained on the site and within public access areas, such as from HPS Phase I Hilltop Park. Under Alternative 5, a stadium would not be constructed at HPS Phase II. Instead, residential and retail uses would be developed at the stadium site and building heights would be limited to 65 feet. Therefore, these residential and retail uses would not substantially block views of scenic vistas, including the Bay. The number of residential and retails units, as well as the square footage of area occupied by residential and retail uses, would be the same as the Project. While development of Alternative 5 would include high-rise towers similar to the Project at Candlestick Point and HPS Phase II, those towers would not be clustered and would not substantially obstruct views of the Bay or beyond from any long-range viewpoints. Therefore, similar to the Project, development under Alternative 5 would not substantially obstruct any scenic vistas, and this impact would be less than significant.

Development under Alternative 5 would not substantially damage scenic resources that contribute to a scenic public setting. Alternative 5 would include redevelopment of the Candlestick Park stadium site and associated paved and unpaved parking lots by replacing degraded urban areas and outdated residential development with new, well-designed urban development and integrated public parks. The Yosemite Slough bridge and roadway approaches would not be constructed and the appearance of the Slough would be unchanged. Scenic resources at HPS Phase II would be retained, including the Re-gunning crane. Additionally under Alternative 5, the stadium would not be constructed at HPS Phase II. The residential and retail uses that would be developed at the proposed stadium site would be limited to a height of 65 feet and would not damage or remove any identified scenic resources. Shoreline improvements at Candlestick Point and HPS Phase II would improve the aesthetic quality of the shoreline, reducing erosion,

including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 5 would not damage or remove any identified scenic resources that contribute to a scenic public setting and the impact would be less than significant.

Alternative 5 would include an overall development program similar to the Project, with the exception of the State Parks agreement; the Yosemite Slough bridge and San Francisco 49ers stadium at the HPS Phase II site would not be constructed. The State Parks agreement would not occur, resulting in less land available for development at Candlestick Point. Therefore, there would be an increase in density of development at Candlestick Point compared to the Project because the overall development area would be smaller. Alternative 5 would include seven towers at Candlestick Point, compared to 11 towers included under the Project, but the average tower height would be greater under Alternative 5 (341 feet compared to 288 feet under the Project). Compared to the Project, there would be three less towers constructed in the Candlestick Point North district and one less tower constructed in the Candlestick Point South district. In addition, as discussed above, the San Francisco 49ers stadium would not be constructed at the HPS Phase II site. Instead, residential and retail uses would be constructed on the proposed stadium site with building heights limited to 65 feet. Therefore, similar to the Project, development under Alternative 5 would change the visual character of the Project site. However, also similar to the Project, Alternative 5 would not substantially degrade the visual character or quality of the site or its surroundings. In fact, development under Alternative 5 would improve the degraded and deteriorated condition of much of the Project site. Development under Alternative 5 would replace the existing conditions with a more dense urban setting, and this would not represent an adverse change. The proposed shoreline improvements would improve the aesthetic quality of the shoreline by reducing erosion, including marsh plantings where appropriate, and removing debris. Similar to the Project, implementation of Alternative 5 would not substantially degrade the visual character or quality of the Project site or its surroundings. The impact would be less than significant.

Without a State Parks land agreement, there would be no established funding mechanism for future maintenance of the State Parks on site from the Project Applicant. Furthermore, increased use of the CPSRA as a result of population and employment growth associated with Alternative 5 is anticipated. Therefore, increased use of the CPSRA without an established mechanism for future maintenance of the CPSRA could result in deterioration of the CPSRA. This could potentially result in a substantial adverse impact on the visual character and quality of the Project site. Without an established funding mechanism to address the increased use, improvements and maintenance of the CPSRA would be the responsibility of CDPR. Therefore, development of Alternative 5 could result in a new adverse impact to the land use character of the CPSRA, unless a funding mechanism is established.

Development under Alternative 5 would increase lighting on the Project site relative to existing outdoor lighting and new building surfaces and would increase the level of illumination in the area. Area lighting would illuminate larger areas that are well traveled so as to promote way finding and provide for a safe environment. In addition to area lighting, building lighting would be angled towards building surfaces for aesthetic purposes and/or to illuminate signs. Like the Project, both types of lighting would be designed to avoid direct visibility of the light source. Resolution 9212 prohibits the use of highly reflective or mirrored glass in new construction. Implementation of the identified mitigation measures (MM AE-7a.1, MM AE-7a.2, MM AE-7a.3, and MM AE-7a.4) and compliance with City Resolution 9212 would reduce impacts from light and glare to a less-than-significant level by shielding lighting fixtures, minimizing spill light, screening vehicle

headlights to the maximum extent feasible, and eliminating or minimizing increased glare by the use of non-reflective glass and non-reflective textured surfaces within the proposed development area.

Potential stadium lighting impacts would be avoided because the San Francisco 49ers stadium would not be constructed.

Shadows

Development under Alternative 5 would include the same building heights, layouts, and orientations of buildings as the Project. As discussed above, the State Parks agreement would not occur resulting in less land available for development at Candlestick Point. Therefore, there would be an increase in density of development at Candlestick Point compared to the Project because the overall development area would be smaller. Alternative 5 would include seven towers at Candlestick Point, compared to 11 towers included under the Project, but the average tower height would be greater under Alternative 5 (341 feet compared to 288 feet under the Project). Compared to the Project, there would be three less towers constructed in the Candlestick Point North district and one less tower constructed in the Candlestick Point South district. Under Alternative 5, the existing public open space, Bayview Park and Gilman Park, would not be affected by new shading from development. Gilman Park would experience some shading on winter afternoons. Those shadows would be cast by buildings that do not exceed 40 feet in height, are not subject to *Planning Code* Section 295, and, therefore, would not be considered an adverse impact. No new shadow would be cast on Bayview Park. The CPSRA would be affected by new shade in the afternoon because the towers at Candlestick Point would be taller compared to the Project, but most areas would experience limited new shadow from development under Alternative 5. At HPS Phase II, the existing public open space, in the Project vicinity including India Basin Shoreline Park and India Basin Open Space, would not be affected by new shading from development under Alternative 5. Under Alternative 5, a stadium would not be constructed at HPS Phase II. Residential and retail uses would be constructed on the stadium site and building heights would be limited to 65 feet. Shadows from these uses on adjacent open space areas would be reduced compared to shadows created by the stadium. New shadows cast by development under Alternative 5 on proposed new parks throughout the year would range from little or no shading to large areas of certain parks receiving new shade, particularly in the late afternoon during the vernal and autumnal equinoxes. The extent and duration of shadow on new public sidewalks would increase along street corridors of Alternative 5. Similar to the Project, this new shadow would not be in excess of that which would be expected in a highly urban area. New shade created by implementation of Alternative 5 would occur at limited times of the day and year, and would not substantially affect the use of outdoor recreational facilities or open space. Similar to the Project, this impact would be less than significant.

Wind

Development under Alternative 5 would include structures above 100 feet in height, with maximum heights up to 420 feet, which would extend above surrounding buildings and intercept a large volume of wind. Alternative 5 would include seven towers at Candlestick Point, compared to 11 towers included under the Project, but the average tower height would be greater (341 feet compared to 288 feet under the Project). Because of the exposure of tall structures to wind, the tower structures proposed under Alternative 5 would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open space areas. The degree of change in pedestrian-level wind conditions would be influenced by

building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. Structures nearing or over 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 miles per hour for a single hour of the year would be exceeded. Similar to the Project, the street grid of Alternative 5 would not align with predominant west and west-northwest wind directions and would, therefore, not result in channeling of winds along street corridors. The street grid would orient building faces such that they would not face into the prevailing wind direction; that orientation would reduce potentially significant pedestrian-level wind acceleration at the Project site.

Implementation of the identified mitigation measure (MM W-1a) would reduce the potential impact from wind for development of Alternative 5 by requiring review of all buildings that could result in adverse wind impacts by a qualified wind consultant. Exceedances of the wind hazard criteria, the design must be revised to reduce the impact below the established threshold. Implementation of required design changes, if any, would reduce potential hazardous wind effects at the pedestrian level by forcing wind downwash to tops of podium areas and/or into the street and away from pedestrian areas. Compliance with the mitigation measures would ensure pedestrian safety in pedestrian-access areas. Similar to the Project, through implementation of the identified mitigation measure, wind impacts would be less than significant. Elimination of the bridge would not change any of the Project's potential wind impacts.

Air Quality

As the footprint of development, the total amount of development, and the land uses provided with a Alternative 2 would be the virtually the same as the Project (with the exception of the stadium at HPS Phase II), air quality impacts of Alternative 5 would also be the same as the Project.

Construction activities for Alternative 5 would generate dust; however, they would need to comply with the San Francisco Health Code and BAAQMD requirements. Implementation of MM HZ-15, which would require the Applicant to ensure that construction contractors comply with the dust control strategies included in an approved dust control plan as part of a site-specific dust control plan, would reduce the impacts caused by construction dust to a less-than-significant level.

Construction activities could also create DPM; however, as the development of Alternative 5 would be substantially the same as the Project, implementation of mitigation measures MM AQ-2.1 and MM AQ-2.2, accelerated emission control implementation on construction equipment, would keep this impact less than significant. Construction activities could also generate toxic air contaminant (TAC) containing PM_{10}; however, as construction activities for Alternative 2 would be substantially the same as for the Project, this impact would be less than significant.

Operational emissions associated with Alternative 5 would be the same as those of the Project, therefore the mass emissions would exceed the BAAQMD CEQA thresholds, and this impact would remain significant and unavoidable, similar to the Project. Alternative 5 has the same R&D square footage, therefore potential TAC emissions from facilities in R&D areas would be the same as the Project. With the implementation of mitigation measures MM AQ-6.1 and MM AQ-6.2, this impact would be less than significant.

Additionally, as the scale of Alternative 5 is virtually the same as the Project, the impacts from Alternative 5 traffic (e.g., carbon monoxide and $PM_{2.5}$) would be less than the Project and therefore continue to be less than significant.

According to the current BAAQMD CEQA Guidelines, odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that the BAAQMD regards with potential to generate considerable odors include: wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, oil refineries and chemical plants. Alternative 5 would be a large mixed-use development containing residential, office, retail, R&D, recreational, and entertainment uses. Although there may be some potential for small-scale, localized odor issues to emerge around proposed sources such as solid waste collection, food preparation, etc., substantial odor sources and consequent effects on on-site and off-site sensitive receptors would be unlikely and would be resolved by interventions after receipt of any complaints. This would be a less-than-significant impact. No mitigation is required.

The Project is consistent with regional air quality plans; therefore, as Alternative 5 being the same size as Project would remain consistent with these plans. Alternative 5 promotes the use of alternative transportation modes, such as transit, biking and walking. In addition, it puts housing in close proximity with jobs and retail establishments, reducing the length of trips and further reducing reliance on single-occupancy vehicles. Therefore, Alternative 5 conforms to the regional air quality plan and there would be a less-than-significant impact. No mitigation is required.

Noise

Alternative 5 would remove the stadium proposed under the Project and relocate 1,350 residential dwelling units from Candlestick Point to HPS Phase II, and the State Parks agreement would not occur. Other than the stadium site and elimination of State Parks open space, land uses provided with Alternative 5 would be the same as the Project. As land uses would remain the same, the potential noise impacts would be the same as the Project with the exception that the noise impact from operation of the stadium would not occur under Alternative 5.

Construction activities for Alternative 5 would expose sensitive receptors to increased noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which generally prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction Best Management Practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels, similar to the Project.

Construction activities for Alternative 5 would result in a temporary or periodic increase in ambient noise that would be noticeable and likely cause for human annoyance. Construction activities would occur within 25 feet of existing and future residential uses. Pile driving activities could result in substantial noise levels of up to 107 dBA at new residential uses on the site or at adjacent existing residences. Construction-related temporary increases in ambient noise levels would be considered significant and unavoidable, the same as for the Project.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction Best

Management Practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under Alternative 5, but not to a less-than-significant level, as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of Alternative 5, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with Alternative 5, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of Alternative 5 would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with Alternative 5 would be similar to those shown for the Alternative 5 which also shifts residential uses and does not include the stadium at HPS Phase II, are shown in Table IV-21 (Modeled Noise Levels along Major Project Site Access Roads – Housing Variant) of Chapter IV. According to the noise models, impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. However, there would be slightly lower noise levels than the Project along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, but would still be significant.

Because Alternative 5 would not include a football stadium at HPS Phase II and the stadium at Candlestick Point, noise impacts identified for the Project from football games and concerts would not occur with implementation of Alternative 5. Noise generated from the existing stadium is considered an existing condition and would not be considered an impact of the Project.

Cultural Resources

Alternative 5 would not change the significance of any historic structures at Candlestick Point because no historic resources have been identified at Candlestick Point. Similar to the Project, implementation of Alternative 5 would retain Drydocks 2 and 3 and rehabilitate Buildings 140, 204, 205, and 207 at the HPS Phase II site in accordance with the Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. However, development under Alternative 5 would result in the demolition of Buildings 211, 231, and 253, which are historic resources in the CRHR-eligible Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would result in a significant impact because the proposed actions would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of the identified mitigation measures (MM CP-1b.1 and MM CP-1b.2) would reduce those impacts; however, the demolition of historic resources would not reduce impacts to a less-than-significant level. Therefore, similar to the Project, the impacts to these historical resources, created by developing Alternative 5, would be a significant and unavoidable.

Construction activities associated with Alternative 5 could result in a substantial adverse change in the significance of archaeological resources. The Project site overall is likely to contain subsurface archaeological resources from the Native American, Chinese fishing village, prehistoric, and maritime development periods. Similar to the Project, construction activities associated with Alternative 5 could

disturb those archaeological resources, and result in potentially significant impacts. Implementation of the identified mitigation measure (MM CP-2a) would reduce the effects on archaeological resources to a less-than-significant level. The Yosemite Slough bridge would be eliminated and potential disturbance of archaeological resources resulting from bridge construction would be avoided.

Construction activities associated with Alternative 5 could result in a substantial adverse change in the significance of paleontological resources. Under Alternative 5, the development footprint at Candlestick Point would be smaller than the Project and the development footprint at HPS Phase II would be greater than the Project. The Bay mud underlying portions of the fill is expected to contain paleontological resources. Similar to the Project, implementation of the identified mitigation measure (MM CP-3a) would reduce the effects of construction-related activities to potential paleontological resources in in-water and off-site areas to a less-than-significant level for development under Alternative 5. The Yosemite Slough bridge would be eliminated and potential disturbance of paleontological resources resulting from bridge construction would be avoided.

Hazards and Hazardous Materials

Under Alternative 5, the development footprint at Candlestick Point would be smaller than the Project because the State Parks land agreement would not occur, thereby making less land available for development. The development footprint at HPS Phase II would be greater than the Project. However, extensive construction would occur in locations similar to the Project and would have potential impacts related to exposure to hazardous materials similar to the Project, as presented below.

Under Alternative 5, the construction impacts associated with Hazards and Hazardous Materials would be reduced as compared to the Project because the overall development footprint would be smaller, as there would be no State Parks land agreement or Yosemite Slough bridge. This reduced development would result in a smaller area subject to disturbance.

Site preparation would include deep excavations for large structures such as for residential towers, with plans to use the cut material elsewhere within the Project site as fill, trenching for utility lines, dewatering, grading and compaction and other earth-disturbing activities. As portions of the site are known to contain elevated levels of chemicals in the soil, construction activities could result in exposure of construction workers, the public or the environment to unacceptable levels of hazardous materials if not handled appropriately. MM HZ-1a would reduce effects related to exposure of known contaminants at Candlestick Point by requiring compliance with Article 22A or an equivalent process. At HPS Phase II, potential effects related to exposure to hazardous materials from construction activities would be mitigated through requirements to comply with restrictions imposed on the property through the federal site clean-up process (MM HZ-1b, MM HZ-9, and MM HZ-12). Disturbance of contaminated soil, sediments, and groundwater in the shoreline areas at HPS Phase II, although reduced in scope with the elimination of the Yosemite Slough Bridge, would still occur as a result of shoreline improvements. MM HZ-10b would ensure approval of workplans by the Navy and regulatory agencies prior to any work in the shoreline areas. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts from disturbance of contaminated soil, groundwater and sediments.

At both Candlestick Point and HPS Phase II, compliance with MM HZ-2a.1 would require the preparation and implementation of contingency plans to address unknown contaminants that might be encountered during construction, and compliance with MM HZ-2a.2 would require preparation and implementation of health and safety plans to protect construction workers from exposure to hazardous materials during construction activities. Construction activities could require off-site transport of contaminated soil or groundwater; compliance with federal, state, and local regulations would ensure that no unacceptable exposure to chemicals occur as a result of these activities. Further, mitigation measures MM HY-1a.1, MM HY-1a.2, and MM HY-1a.3 would ensure that no unacceptable levels of hazardous materials in soil in surface runoff or in groundwater are discharged to the sewer system or discharged from the site to the Bay. Hazardous materials impacts from all of the above construction-related activities would be reduced to less than significant with the implementation of the mitigation measures identified above, the same as for the Project.

Development under Alternative 5, as for the Project, would require the installation of foundation support piles, which could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to migrate to the deeper groundwater aquifer. However, MM HZ-5a, which requires preparation of a plan for pilot boreholes for each pile to prevent disturbance of potentially contaminated fill materials and would reduce this potential impact from pile driving to less than significant, the same as for the Project.

Elimination of construction of the Yosemite Slough Bridge would avoid impacts associated with disturbance of potentially radiologically impacted soils at HPS Phase II in the vicinity of Parcels E and E-2, thus reducing the potential for exposure to hazardous materials in soil or groundwater in this area.

Alternative 5 would place housing on the HPS Phase II site. The Navy's cleanup plan is designed to remediate the HPS site to levels acceptable for the planned uses in the existing HPS Redevelopment Plan. To the extent that Alternative 5 proposes to place housing in areas not designated for residential use in the existing HPS Redevelopment Plan, additional hazardous materials remedial work could be required, which could result in some increased risk to workers, the public and environment from exposure to hazardous materials during the construction process. Any property that has not been remediated for unrestricted use at the time of transfer will have use restrictions placed on the property in compliance with the federal clean-up process. For use restrictions to be removed, the Project Applicant would be required by the transfer documents to obtain approval from the regulatory agencies overseeing the clean-up process before residential uses could be placed on these portions of the site. Any remedial activities undertaken as part of the construction process would be subject to the requirements in MM HZ-1b, which requires construction activities at HPS Phase II to be done in accordance with all restrictions imposed on the site by the federal regulatory clean-up process and these impacts would be less than significant, the same as for the Project.

Potential impacts associated with disturbance of naturally occurring asbestos would be similar to those associated with the Project and would be mitigated through MM HZ-15, which requires the preparation of dust control plans as required by BAAQMD and DPH. Alternative 5 would involve the demolition of existing structures that may contain asbestos-containing building materials, lead-based paint and other hazardous materials, the same as the Project. The existing regulatory framework and approval process would avoid potential hazards from demolition or building preservation activities and impacts would be less than significant, the same as the Project.

Alternative 5 would involve off-site roadway improvements, which could result in disturbance of hazardous material in soil or groundwater. Unacceptable exposures would be controlled as for the Project by implementation of MM HZ-1a, and hazardous materials impacts from these activities would be less than significant.

Project operations would involve routine use, storage, transport, or disposal of hazardous materials. The use of such materials would be the same as for the Project, as the development program is essentially the same. Compliance with applicable federal, state, and local regulations related to the use, storage and transport of such materials would result in a less-than-significant impact from hazardous materials usage, the same as for the Project.

Geology and Soils

Construction activities, such as removal of paved areas, grading, and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. However, requirements to control surface soil erosion during and after construction of Alternative 5 would be implemented through the requirements of the identified mitigation measure (MM HY-1a.1), and adverse effects on the soil such as soil loss from wind erosion and stormwater runoff would be reduced to a less-than-significant level. Soil erosion impacts associated with construction of the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 5.

Construction activities would have the potential to affect groundwater levels. Construction may include dewatering procedures during excavation, construction, and operation of foundations and buried utilities. The dewatering could cause settlement of adjacent soils that could damage the overlying foundations of existing buildings. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by the identified mitigation measure (MM GE-2a), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Similar to the Project, settlement hazards related to dewatering would be less than significant for development under Alternative 5.

Development of Alternative 5 would require rock removal activities at the Alice Griffith and Jamestown districts that could result in damage to structures from vibration or settlement caused by the fracturing of bedrock for excavation. With implementation of the identified mitigation measure (MM GE-3), vibration from controlled rock fragmentation in the area would not cause unacceptable settlement at adjacent or nearby properties. Similar to the Project, settlement hazards related to controlled rock fragmentation would be less than significant for development under Alternative 5.

The potential for exposure to adverse effects caused by seismic groundshaking and seismically induced ground failure such as liquefaction, lateral spreading, landslides and settlement exists at the Project site. The identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, MM GE-5a, and MM GE-6a) would require design-level geotechnical investigations for development under Alternative 5. Design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of structures, as required by the SFBC through review by DBI. The structural design review would ensure that all necessary mitigation methods and techniques are incorporated in the design for foundations and structures to reduce potential impacts from ground failure

or liquefaction to a less-than-significant level for development under Alternative 5. Seismic-related groundshaking hazards associated with the Yosemite Slough bridge would be avoided because the bridge would not be constructed under Alternative 5.

The existing shoreline exhibits active erosion and consists of areas of unprotected slopes and dilapidated naval pier and wharf structures. Similar to the Project, Alternative 5 would include numerous shoreline improvements, including additional concrete revetments, creation of new beach and tidal habitat, and some grading and importation of fill at certain locations. These improvements would improve the stability of the shoreline. Therefore, Alternative 5 would not result in the exposure of structures and facilities at the Project site to substantial adverse effects caused by shoreline instability. Similar to the Project, the impact would be less than significant.

The potential for adverse effects caused by landslides, settlement, expansive and corrosive soils, exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual elements of development for Alternative 5, as specified in the identified mitigation measures (MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, MM GE-5a, MM GE-6a, MM GE-10a, MM GE-11a) for the Project. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of those mitigation measures, impacts with regards to landslides, settlement, and expansive and corrosive soils would be less than significant. Potential ground failure impacts associated with construction of the Yosemite Slough bridge and the stadium would be avoided because the bridge and stadium would not be constructed under Alternative 5.

Hydrology and Water Quality

The footprint of development for Alternative 5 would be reduced compared to the Project, because no State Parks agreement would occur and the Yosemite Slough Bridge would not be constructed. The extent of development would be reduced compared to the Project, because the stadium would not be constructed, and portion of residential uses proposed at Candlestick Point under the Project would be shifted to HPS Phase II. As a result, at Candlestick Point the density of development would increase and the extent of development would be reduced compared to the Project. At HPS Phase II, the density and extent of development would remain similar to the Project, as residential development would increase by 1,350 units in place of the stadium. As such, impacts from construction of the Alternative 5 would be less than the Project. With residential uses being shifted from Candlestick Point to HPS Phase II, replacing the stadium and associated parking lots, the total amount of development would be reduced, and the extent of impervious surfaces would be reduced as the footprint of development for Alternative 5 would be reduced compared to the Project and development densities would be greater. Thus, operational impacts to hydrology and water quality would be less than the Project.

With adherence to applicable regulatory requirements, construction activities associated with Alternative 5 would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With reduced overall development, impacts would be less than the Project, however mitigation measures

proposed under the Project would be still be applicable. With implementation of mitigation measures MM HY-1a.1 (preparation of a Storm Water Pollution Prevention Plan—SWPPP—for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

Construction activities associated with Alternative 5 would include excavation for building foundations and underground utilities which could require short-term and/or long-term dewatering of the affected areas. As no extensive underground space is proposed for Alternative 5, the installation of underground building elements and utilities would not substantially alter groundwater levels, similar to the Project. As such, Alternative 5 would not substantially deplete groundwater supplies and would result in a less than significant impact, similar to the Project. As the total amount of open space under Alternative 5 is reduced compared to the Project, the amount of permeable surface within the Project footprint would also be less. Although, the State Parks agreement would not occur, the existing open space accounted for under the Project would remain. Therefore, Alternative 5 would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within Alternative 5 site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of Alternative 5, the existing drainage patterns within the area would generally be preserved. Construction activities associated with Alternative 4 would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated with Alternative 5, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of an SWPPP) impacts would be less than significant, similar to the Project.

Operation of Alternative 4 would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of Alternative 4. In addition, Alternative 5 would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities

at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the extent of impervious surfaces for Alternative 5 would be reduced than the Project, impacts would be less than the Project.

Development under Alternative 5 would also not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of Alternative 5 could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on or off site similar to the project. Implementation of Alternative 5 would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of Alternative 5 would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of Alternative 5 would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, Alternative 5 would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

Similar to the Project, Alternative 5 would involve removal and/or modification of areas that have the potential to contain special-status species, including: seven potentially breeding avian species, one bat species, and four fish species (green sturgeon, Chinook, steelhead, and longfin smelt). Alternative 5 would also have the potential to affect designated critical habitat of the green sturgeon and Central California Coast steelhead and thus, directly impact threatened and/or endangered species through habitat conversion or unauthorized take. In addition, activities would occur within habitats of locally rare or sensitive species such as Pacific herring and Olympia oysters, as well as avian species protected by the MBTA. Elimination of the Yosemite Slough bridge would avoid potential impacts to adverse effects to special-status species in and around Yosemite Slough. Alternative 5 would include implementation of the ecological design features described in the Project's Draft Parks, Open Space, and Habitat Concept Plan that would result in multiple

measures to avoid, limit, and mitigate for impacts to special-status and legally protected species. Specifically, the design components would remove invasive species; restore, preserve, and enhance wetland, aquatic, and grassland habitats; revegetate the site with extensive planting of trees and shrubs; increase the vegetative cover for foraging and dispersing animals; and maintain and enhance habitat connectivity along the shoreline. Alternative 5, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-6a.1, MM BI-6a.2, MM BI-6b, MM BI-7b, MM BI-9b, MM BI-18b.1, and MM BI-18b.2) and ecological design features, would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Impacts would be less than the Project, and, similar to the Project, impacts would be less than significant after mitigation for development under 5.

Development of Alternative 5 could have a substantial adverse effect on sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFG or USFWS. The only sensitive habitats other than wetlands and aquatic habitats are eelgrass and areas designated as EFH. Elimination of the Yosemite Slough bridge would avoid potential adverse effects to sensitive natural communities and their habitats in and around Yosemite Slough. Shoreline improvements, shoreline abutments for the proposed marina, and installation of the breakwater at HPS Phase II could have substantial adverse impact to the communities. However, with implementation of the identified mitigation measures (MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12b.1, MM BI-12b.2, MM BI-12b.3, MM BI-18b.1, MM BI-18b.2, MM BI-19b.1, and MM BI-19b.2), impacts of Alternative 5 on sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFG, NMFS, or USFWS would be reduced to a less-than-significant level. Potential impacts to eelgrass beds would be the same as the Project (eelgrass beds are not located near Yosemite Slough), while impacts to EFH would be less than the Project since construction associated with Yosemite Slough bridge would be avoided and, thus, EFH would not be impacted through the construction of pilings required to support the bridge.

The shoreline improvements included Alternative 5 would be similar to the Project and could have substantial temporary and permanent adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. . Those impacts would be substantially reduced compared to the Project because the Yosemite Slough bridge would not be constructed. As a result, impacts to approximately 0.70 acre of other waters, 0.01 acre of tidal salt marsh, and 0.96 acre of shadow fill would be avoided. The identified mitigation measures would reduce the effects of construction-related activities to wetlands and other waters by mitigating for the temporary and permanent loss of the wetlands and jurisdictional waters through avoidance of impacts, requiring compensatory mitigation (i.e., creation, preservation, and/or restoration), obtaining permits from the USACE, SFRWQCB, and BCDC that are designed to protect wetlands and jurisdictional waters, and implementing construction BMPs to reduce and/or prevent impacts to waters of the United States, including wetlands and navigable waters. With implementation of the identified mitigation measures (MM BI-4a.1 and MM BI-4a.2), the impacts of development under Alternative 5 to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project. However, impacts would be less than the Project.

Development of Alternative 5 could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site. The Project site is surrounded by open water and urban development and no major drainages, canyon bottoms, ridgetops, rivers, creeks or areas that provide substantial movement corridors or migratory pathways occur within the Project site. However, similar to the Project, implementation of Alternative 5 would place new residential towers and a stadium with light towers along a portion of the San Francisco Bay shoreline. The increase in strike hazards from the tall buildings and the potential for lighted stadium towers to alter flight paths could substantially interfere with migratory avian flight paths, which would be considered a potentially significant impact to migratory birds. Compared to the Project, the strike hazard related to the stadium light towers would be avoided because no stadium would be constructed. With respect to aquatic species, although migratory fish could continue to move though the open water and Yosemite Slough, the Project site does not contain any substantial migratory fish pathways such as anadromous fish streams. Elimination of the Yosemite Slough bridge would avoid adverse effects to special-status aquatic species and their habitats in and around Yosemite Slough. However, construction of breakwaters and other shoreline treatments in HPS Phase II would occur near eelgrass beds, which could directly or indirectly impact eelgrass beds such that productivity and survival of these habitats would be substantially reduced. Similar to the Project, with implementation of the identified mitigation measures (MM BI-5b.1 through MM BI-5b.4, MM BI-20a.1, and MM BI-20a.2), the potential impacts of Alternative 5 would be reduced to a less-than-significant level because it would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Similar to the Project, Alternative 5 would be required to comply with mitigation measure MM BI-14a to ensure that Project development would not result in conflicts with the City's tree protection ordinances. With implementation of MM BI-14a, Alternative 5 would not conflict with any local policies or ordinances protecting biological resources and impacts would be less than significant, similar to the Project.

Public Services

Police Protection

During construction of Alternative 5, emergency access to the Project site would be maintained through compliance with the CTMP. The purpose of a CTMP is to ensure that the impacts of construction on the public domain, in particular with respect to temporary interruptions to vehicular and pedestrian traffic, are considered and addressed. Because Alternative 1 would include the same mitigation as the Project, there would be a similar requirement to prepare a CTMP for Alternative 5 that would address temporary impacts on circulation during construction. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. Construction activities associated with implementation of Alternative 5 also could increase demand for SFPD services if the site is not adequately secured, providing increased opportunity for criminal activity. To ensure adequate site security, mitigation measure MM PS-1 would require the Project Applicant to provide security during construction. Therefore, this impact would be less than significant, the same as for the Project.

Implementation of Alternative 5 would increase resident and employee population at the Project site resulting in a potential increase in the need for 53 additional police personnel to provide a comparable level of service to existing conditions. The SFPD evaluates the need for additional officers by sector, and not station or district needs. While it is unlikely that 53 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development of Alternative 5.

If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 sf could be constructed within the Project site, on land designated for community-serving uses. As part of the this Alternative, up to 100,000 gsf of land divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses including a police station. Construction of a new SFPD facility (counter, storefront, or other configuration) within these community services uses and/or the reconfiguration or expansion of the existing Bayview Station would be funded by the Project Applicant. Similar to the Project, Alternative 5 includes community service use areas, and as construction would be funded by the Project Applicant, the SFPD would maintain acceptable levels of police service. Therefore, development of this Alternative would not require new or physically altered police facilities beyond the scope of the Project in order to maintain acceptable police services. This impact is considered less than significant.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Fire and Emergency Medical Services

Alternative 5 would add 10,500 residential units and substantially increase employment-generating uses, resulting in an employment population of 10,730. The increase in the residential and daytime employment population (for a total population of 35,195, including residential population of 24,465 plus 10,730 employees), combined with an increase in the intensity of physical development on the Project site, would result in new demand for fire protection and emergency medical services.

During construction of Alternative 5, emergency access to the Project site would be maintained through compliance with the CTMP, as required by mitigation measure MM TR-1. Construction of a new SFFD facility on land designated for community-serving uses on the Project site (where costs would be borne by the Project Applicant), would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. Similar to the Project, construction of 100,000 gsf of community facilities, which would include a new SFFD facility, would be included as a component of Alternative 5. As no stadium would be constructed, there would be no demand for additional emergency services on game days. Therefore, development under Alternative 5 would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is considered less than significant.

The bridge over the Yosemite Slough under the Project would offer a direct, separated right-of-way between Candlestick Point and HPS Phase II that would not be available under this alternative. This could result in an increase in response times compared to the Project, and could be a potentially significant impact not occurring with the Project.

Schools

A total of approximately 2,131 school-age children would live within the Project site following full build-out of Alternative 5. While schools in the Project vicinity have approximately 49 percent capacity remaining in the 2008-2009 school year, it is likely that a 12 percent overcapacity of SFUSD as a result of citywide population growth in 2030 would occur. Similar to the Project, the payment of school impact fees pursuant to SB50 would constitute full mitigation for any potential schools impacts. This impact is considered less than significant for development under Alternative 5.

Libraries

Construction of Alternative 5 would not result in impacts to the SFPL. No library branches are located on the Project site. All library services would be available to the community throughout the duration of construction. As such, no impact to library services during construction of Alternative 5 would occur.

Residential and nonresidential development associated with Alternative 5 would increase demand for local library services in the Bayview neighborhood. Although this Alternative would result in a substantial direct and indirect population increase within the Bayview neighborhood, library branches serving the Project site, including the Portola, Visitacion Valley, and the Bayview branches would continue to meet the demands of the community. In addition to the three library branches serving Alternative 5, the proposed development would include space dedicated to library services to supplement the Bayview branch library. As part of Alternative 5, a 1,500-gsf reading room and automated book-lending machines would be integrated into the community retail and public facilities uses. The SFPL branches, and the dedication of space to accommodate library services on the Project site in order to supplement SFPL branches, would accommodate increased demand from development under this Alternative. No additional library facilities would be required to accommodate development of Alternative 5. Therefore, no new or physically altered library facilities would be required in order to maintain acceptable service ratios and this impact is considered less than significant for development under Alternative 5.

Recreation

Implementation of Alternative 5 would include parks and open space areas similar to the Project, except it would not include a State Parks land agreement, resulting in a different configuration of parks at Candlestick Point. Compared to the Project, the CPSRA would remain 120.2 acres, compared to the 23.5-acre reduction under the Project. Neighborhood parks would be constructed within the Candlestick Point districts, but the total area would be reduced compared to the Project. Construction activities associated with the proposed parks and recreational facilities are considered part of the overall development footprint. Since this Alternative is similar to the Project, construction impacts anticipated to result from implementation of this Alternative are analyzed throughout the technical sections of this EIR. Such impacts would be temporary and would be mitigated by measures identified in Section III.D, Section III.H, Section III.I, and Section III.K, Section III.M, and Section III.N. These measures address construction-related impacts including, but not necessarily limited to, traffic and circulation, air quality, noise, exposure to hazardous material, and soil erosion, which would help reduce potential impacts to recreational resources. In addition, because the State Parks land agreement would not occur, the improvements to the CPSRA as proposed under the Project would not be constructed. Therefore, construction activities at Candlestick Point would be reduced and construction impacts associated with development of new parks and recreational facilities would be less than significant.

At build-out of Alternative 5, the projected population within the Project site would increase from approximately 1,113 residents to approximately 24,465 residents, while employment would increase from 529 jobs to approximately 10,730 jobs. Compared to the Project, the CPSRA would remain 120.2 acres, compared to the 23.5-acre reduction under the Project. Similar to the Project, parks and open space included in Alternative 2 would provide a ratio of about 15.2 acres of parkland per thousand residents, which is substantially higher than the benchmark ratio of 5.5 acres per thousand residents (refer to Section III.P). A total of 5.9 acres of neighborhood parks would be constructed at Candlestick Point compared to 8.1 acres under the Project. The increase in population and employment could result in an increase in the use of existing parks, recreational facilities, and open space. During a given phase, however, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual, and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed. Parks and open space at HPS Phase II would include improvements similar to the Project and would help offset the increase in demand created by new residents and employees. The 1.4-acre Alice Griffith Neighborhood Park would serve residents of the Alice Griffith Public Housing site.

Without a State Parks land agreement, there would be no established funding mechanism for future maintenance of the State Parks on site from the Project Applicant. Furthermore, increased use of the CPSRA as a result of population and employment growth associated with Alternative 5 is anticipated. Therefore, increased use of the CPSRA without an established mechanism for future maintenance of the CPSRA could result in deterioration of the CPSRA. This could potentially result in a substantial adverse impact on recreational facilities at the Project site. Without an established funding mechanism to address the increased use, improvements and maintenance of the CPSRA would be the responsibility of CDPR. Therefore, development of Alternative 5 could result in a new adverse impact on recreational facilities that would not occur under the Project.

A windsurfing launch site is located in the CPSRA. Windsurfing could potentially be impacted by the construction of tall structures in close proximity to the Bay that affect wind patterns and direction. Similar to the Project, development under Alternative 5 would include structures above 100 feet in height, with maximum heights up to 420 feet, which would extend above surrounding buildings and intercept a large volume of wind. Alternative 5 would include seven towers at Candlestick Point, compared to 11 towers included in the Project, but the average tower height would be greater (341 feet compared to 288 feet under the Project). Therefore, due to these taller building heights, impacts to windsurfing could be greater under build-out of Alternative 5.

Utilities

Water Supply

Alternative 5 would include water infrastructure similar to the Project. Impacts of construction activities associated with this infrastructure, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of water conveyance or treatment infrastructure

associated with the Project. The water required for construction activities is assumed to be supplied by water trucks and/or existing sources. No construction-related impacts associated with the consumption of water would occur with the Alternative 5.

Alternative 5 would have a similar residential and non-residential build-out compared to the Project except the San Francisco 49ers stadium would not be constructed. Because Alternative 5 would not include the stadium it would generate a total demand of approximately 1.65 mgd, 0.02 mgd less than the Project. As current water use from existing land uses at the Project site is approximately 0.3 mgd, the net effect of the Alternative 5 on water demand would be an increase of approximately 1.35 mgd.[1371] As stated in the Water Supply Assessment provided for the Project, the SFPUC projects that adequate supply would be available to satisfy all retail demand, including Project-related demand, under normal conditions (refer to Appendix Q1). Therefore, there would be sufficient water supplies to accommodate the water demand of Alternative 5. This is considered to be a less-than-significant impact. Similar to the Project, implementation of Alternative 5 would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant.

Implementation of Alternative 5 would require expansion of the existing off-site AWSS by providing an AWSS loop at Candlestick Point that would connect to the planned extension of the existing off-site AWSS on Gilman Street from Ingalls Street to Candlestick Point. At HPS Phase II, the AWSS would be connected to the existing AWSS system at the intersection of Earl Street and Innes Avenue and at the Palou Avenue and Griffith Avenue intersection with a looped service along Spear Avenue/Crisp Road. Implementation of the identified mitigation measure (MM UT-2) would ensure the provision of adequate water for on-site fire-fighting purposes, and the Project would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements for water to fight fires. The impact is less than significant with implementation of this mitigation measure.

Wastewater

Under Alternative 5, development would discharge a total maximum peak flow of maximum peak flow of 2,417 gpm in the Hunters Point tunnel sewer (41 gpm less than the maximum peak flow of Project because the stadium would not be constructed), which has an existing unused capacity of 69,853 gpm in dry weather. This represents 3.5 percent of the available capacity of the Hunters Point tunnel sewer, which could be accommodated by the existing off-site infrastructure.

The wastewater generated under Alternative 5 would be 41 gpm less than the maximum peak flow of Project. As with the Project, it is possible that a temporary increase in CSO volume could occur during wet weather if structures are occupied and contribute wastewater to the Combined Sewer System prior to completion of the separate stormwater and wastewater infrastructure of Alternative 5. Implantation of the identified mitigation measure (MM UT-3a) would ensure that there would be no increase in CSO flows as a result of the Project by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project. The impact on the Combined Sewer System would be reduced to less than significant.

[1371] Water demand for this alternative was estimated by prorating water demand for the Project (presented in Table III.Q-4) based on build-out of Alternative 5.

The wastewater generated under Alternative 5 would be less than the Project. The current remaining treatment capacity of the SWPCP would accommodate the increase in wastewater flows from the Project development. Overall flows during wet weather would decrease, indicating that the proposed diversion of wet-weather flows away from the combined system would offset the increase in dry-weather flows, assuming completion of utility infrastructure prior to occupancy of Alternative 5. Based on this analysis, the overall volumes in the Bayside system during wet weather would be less than under existing conditions with implementation of Alternative 5. It is possible that a temporary increase in CSO volume could occur (which could affect the capacity of the SWPCP for treatment) during wet weather, as noted, above. Implantation of the identified mitigation measure (MM UT-3a) would reduce this impact to less than significant by providing temporary detention or retention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for Alternative 5. Thus, Alternative 5 would not result in any net increase in CSO volume in the Bayside system during wet weather. A less-than-significant impact to existing off-site treatment facilities would occur.

Development associated with Alternative 5 would incrementally contribute wastewater during dry and wet-weather events to the Combined Sewer System operated by the SFPUC, but overall, wet-weather volumes would decrease in the Bayside system with construction of the alternative's separate stormwater and wastewater systems. Compliance with any applicable permit requirements, as monitored and enforced by the SFPUC, would ensure that the Alternative 5 would not exceed the applicable wastewater treatment requirements of the RWQCB. In addition, Alternative 5 would not cause the City to exceed the requirements of the NPDES permit for the reasons previously stated and because the flows during wet weather would actually decline compared to existing flows from the Project site. This impact would be less than significant.

Solid Waste

Demolition of existing facilities within the Project site under Alternative 5 would generate approximately 971,785 tons of construction debris. Some construction and demolition debris would be reused on site, while other materials would be transported off site for separation. Materials that cannot be reused or recycled would be transported to the landfills in the area. With implementation of the identified mitigation measure (MM UT-5a), the Project Applicant would be required to submit a Waste-Diversion Plan demonstrating strategies to divert at least 75 percent of total construction wastes before receiving building permits. This would reduce construction debris transported to the landfill to 25 percent, or 242,946 tons. At an average density of 1 ton per cubic yard, this equals 242,946 cubic yards, or 0.5 percent of the available capacity at Altamont Landfill as of 2009.

At current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1372] Under Alternative 5, demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 65 percent of construction waste, as also required by mitigation measure MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Alternative 5 on solid waste would be further

[1372] CIWMB, 2009.

reduced. The impact of the construction waste generated by the Alternative 5 on the capacity of the Altamont Landfill would be less than significant.

Construction activities, including demolition and excavation, could require disposal of hazardous wastes such as asbestos, lead-based paint, and contaminated soils. The amount of these materials would be that could be disturbed would be less than the Project because the Yosemite Slough Bridge would not be constructed. Hazardous waste would require disposal by a licensed transporter to a TSD authorized to treat such hazardous waste. Disposal of these wastes would occur intermittently during the construction period, and would not likely represent a substantial amount of hazardous waste in a given year. Currently, TSDs in California and adjoining states have sufficient capacity to accommodate all hazardous wastes (refer to Setting). Depending on a number of factors, some soil would be transported off site for disposal and some soil may be transported to other areas of the site. Contaminated soils may require transportation off site and treatment at authorized TSDs. Because the TSDs in California and adjoining states have sufficient capacity to treat hazardous wastes, construction of Alternative 5 would not generate hazardous wastes (construction debris or contaminated soil) that would exceed the capacity of TSDs authorized to treat such waste. This would be a less-than-significant impact.

At full build-out, the Alternative would generate approximately 19,487.8 tons annually when all uses are fully operational and assuming no waste-reduction measures. The amount of solid waste generated under Alternative 5 would be 2,339.2 tons less than the Project because the stadium would not be constructed. Solid waste generated under Alternative 5 would represent approximately 3.3 percent (compared to 3.7 percent under the Project) of the total waste generated in San Francisco as of 2008 (approximately 594,732 tons). All residents and businesses of Alternative 5 would be required to comply with the City's mandatory recycling and composting ordinance. In addition, consistent with the City's goal of achieving zero waste by the year 2020, the Project Applicant would prepare a Site Waste Management Plan as required by the identified mitigation measure (MM UT-7a.1) that would specify the methods by which the Alternative 5 would divert operational solid waste to assist the City in achieving its diversion goals. The impact of operational solid waste generated by Alternative 5 on the capacity of the Altamont Landfill (and/or the landfill with which the City contracts at the close of the current selection process) would be less than significant.

Nearly all uses under Alternative 5 would involve the routine use of hazardous materials at varying levels that would require disposal. The amount of hazardous materials would be reduced because the stadium would not be constructed. Quantification of precise amounts of additional hazardous materials use associated with new proposed uses is not practical at this time. Therefore, it is assumed that a variety of hazardous materials could be used in small quantities, ranging from R&D in which a wide variety of hazardous materials would be used, to facilities such as the proposed stadium, where fuels and maintenance products would comprise the majority of hazardous materials, to smaller-scale users, such as artists' studios, and the marina, where small quantities of fuel could be utilized. The amounts of hazardous waste that would be generated by such uses would not be substantial. In addition, new residents and businesses would be expected to comply with all hazardous waste regulations, including the disposal of household hazardous waste. Because the minimal amount of hazardous waste that would be generated by the Alternative 5 could be accommodated by existing TSD facilities, this impact would be less than significant.

Electricity, Natural Gas, and Telecommunications

The proposed utility infrastructure improvements for Alternative 5 would include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications, the same as for the Project. This alternative would not include the new stadium, CPSRA improvements, or the Yosemite Slough bridge. As the development would be smaller than the Project, less electricity, natural gas, and telecommunications serves would be required. Infrastructure expansion would not be as extensive as required for the Project. However, these differences between Alternative 5 and the Project would not substantially affect the infrastructure plan as presented for the Project and, therefore, impacts would be the same as for the Project, and less than significant.

Energy

Construction activities associated with implementation of Alternative 5 would require energy sources including electricity, diesel, and gasoline. Similar to the Project, the construction activities for Alternative 5 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy and would be subject to requirements to minimize wasteful fuel consumption. Energy use during the construction period would be similar to the Project but slightly reduced because construction of the Yosemite Slough bridge and stadium would not occur. Furthermore, given the type of development proposed under this Alternative, the energy demand created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related energy use associated with development under Alternative 5 would be considered less than significant.

Implementation of Alternative 5 would result in baseline electricity consumption similar to the Project and would include the energy savings associated with the Project Applicant's commitment to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project, those efficiency measures would result in consumption of at least 5.4 percent less electricity than a project that would not implement such measures. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts of Alternative 5 to less than significant. In addition, the San Francisco 49ers stadium would not be constructed at HPS Phase II resulting in reduced electricity demand compared to the Project.

Implementation of Alternative 5 would result in baseline natural gas consumption similar to the Project and would include efficiency measures similar to the Project resulting in the use of approximately 13 percent less natural gas than a development project without such measures. Those efficiency measures would result in consumption of at least 13 percent less natural gas than a development project without

such measures. In addition, the Project Applicant will also implement renewable energy strategies, such as the use of photovoltaic cells to provide electricity, the use of solar thermal energy to provide space cooling with the use of absorption systems, and/or water for space heating and domestic water systems. However, because the Project Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential natural gas consumption impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Project Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts of Alternative 5 to less than significant. In addition, the San Francisco 49ers stadium would not be constructed at HPS Phase II resulting in reduced natural gas demand compared to the Project.

Alternative 5 would increase trips to and from the Project site, increasing the use of petroleum fuels. Based on average fuel efficiencies for the City of San Francisco and a VMT similar to that of the Project, this Alternative would result in a demand for 14.01 million gallons of gasoline and 0.93 million gallons of diesel annually. Similar to the Project, fuel consumption resulting from travel to and from the Project site would be five times as high as under existing conditions, indicating a large increase in consumption. However, this consumption would not be wasteful because (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. Without the San Francisco 49ers stadium at HPS Phase II, game day and event-related fuel consumption would be avoided. Therefore, similar to the Project, Alternative 5 would not be wasteful with respect to petroleum fuel consumption, and impacts are considered less than significant.

Greenhouse Gas Emissions

Similar to the Project, construction activities associated with implementation of Alternative 5 would emit GHGs associated with diesel and gasoline consumption. Similar to the Project, the construction activities for Alternative 5 would not include unusual or atypical activities that would result in a higher-than-average demand for fuels. Construction would consist of temporary activities that would not be a prolonged source of GHG emissions. GHG emissions during the construction period would be similar to the Project but slightly reduced because construction of the Yosemite Slough bridge and stadium would not occur. Furthermore, given the type of development proposed under this Alternative, the GHG emissions during the construction period would not be large in comparison to a project of a similar size and with similar land uses. Therefore, construction-related GHG emissions and climate change impacts associated with development under Alternative 5 would be considered less than significant.

Implementation of Alternative 5 would result in baseline GHG emissions similar to the Variant 2 and would include the GHG emissions savings associated with mitigation measures including MM GC-1

through MM GC-4 which requires the implementation of the Project Applicant's conceptual commitments to (1) reduce energy use to 15 percent below Title 24 2008 standards for all development components, and (2) use ENERGY STAR appliances for all appliances installed by builders in residential units. This Alternative would also be required to comply with the City's Green Building Ordinance, per Chapter 13C of the *Environment Code*. Similar to the Project and Variant 2, Alternative 5 would increase trips to and from the Project site, increasing the use of petroleum fuels. However, this Alternative would also include the Project Applicant's commitment to reduce transportation related GHG emissions: (1) this Alternative would include measures to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) this Alternative would include a TDM program designed to reduce the remaining vehicle trips; and (3) this Alternative would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as overall trip lengths. The programs included in this Alternative for minimization of trips, as well as the density, mix of uses, and overall physical layout, would result in efficiency in the total amount of fuel consumed by shortening trip lengths and shifting trips from vehicular modes of travel. Without the San Francisco 49ers stadium at HPS Phase II, game day and event-related GHG emissions would be avoided. Thus, GHG emissions at the Project site under development of Alternative 5 would not inhibit the achievement of the goals of AB 32 or the SFCAP. Similar to the Project and Variant 2, GHG emissions and climate change impacts would be less than significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for Alternative 5 and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change. Alternative 5 would reduce total development compared to the Project. Alternative 5 would decrease the housing density and alter the service population which would impact the amount of GHG emissions per service population. Without a quantitative analysis, the comparison to the BAAQMD threshold cannot be judged, and Alternative 5 may not be below the proposed threshold.

Attainment of Project Objectives

Alternative 5 would meet most of the Project objectives, although it would meet transportation-related objectives to a lesser extent than the Project because this Alternative does not include the Yosemite Slough bridge. Refer to Table VI-10 (Attainment of Project Objectives Alternative 5) below for a discussion of each objective.

Table VI-10 Attainment of Project Objectives Alternative 5

Objective	*Meets Project Objective?*	*Analysis*
1. The integrated development should produce tangible community benefits for the Bayview and the City.	Y-	Alternative 5 would include the same development program and uses as the Project, resulting in the same range of job and economic development opportunities. This alternative would renovate and replace the artist studios at HPS Phase II and create a permanent space for artists. However, it would include substantially less parks and open space amenities compared to the Project because no State Parks agreement would occur and no improvements would be made to the CPSRA. Alternative 4 would not meet this objective to the same extent as the Project.
2. The integrated development should re-connect Candlestick Point and the Hunters Point Shipyard site with the larger Bayview neighborhood and should maintain the character of the Bayview for its existing residents.	Y-	Alternative 5 would include the same development program and uses as the Project. The proposed mix of uses and urban design concepts would provide a direct physical, visual, and architectural connection to the Bayview neighborhood and City. This alternative also includes extension of the transportation network into the Project site. Those connections would allow residents of the Bayview neighborhood and City to access the commercial, cultural, and institutional opportunities at the Project site. However, this alternative would not include the Yosemite Slough bridge. Therefore, while Alternative 5 would meet this Project objective, it would not meet it to as great an extent as the Project.
3. The integrated development should include substantial new housing in a mix of rental and for-sale units, both affordable and market-rate, and encourages the rebuilding of Alice Griffith Housing.	Y	Alternative 5 would include a variety of unit types, sizes, and structures, and a wide range of affordability levels. This alternative would also include the redevelopment of the Alice Griffith Public Housing site. Therefore, Alternative 2 would meet this Project objective.
4. The integrated development should incorporate environmental sustainability concepts and practices.	Y	Alternative 5 would include the same sustainability principles and concepts as the Project. Therefore, Alternative 5 would meet this Project objective.
5. The integrated development should encourage the 49ers—an important source of civic pride—to remain in San Francisco by providing a world-class site for a new waterfront stadium and necessary infrastructure.	N	Alternative 5 would not include construction of a new stadium and would not meet this Project objective.
6. The integrated development should be fiscally prudent, with or without a new stadium.	Y	Development of Alternative 5 would increase sales tax revenue to the City to a similar extent compared to the Project and include a development program that would encourage substantial private capital investment. Alternative 2 would meet this Project objective.

Y = Alternative does meet Project objective.
Y- = Alternative meets Project objective, but to a lesser extent than the Project.
Y– = Alternative meets Project objective, but to a significantly lesser extent than the Project.
N = Alternative does not meet Project objective.

VI.D ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The City's primary objective for the Project is to revitalize the BVHP community by providing the following: increased business and employment opportunities; housing options at a range of affordability levels; improved public recreation and open space amenities; an integrated transportation, transit, and infrastructure plan; and other economic and public benefits, all of which would collectively have no net negative impact on the City's General Fund.

Alternative 1 (No Project) would reduce Project impacts because development would only occur at HPS Phase II, resulting in reduced construction-related impacts and fewer or less substantial operational impacts due to the reduced population and employment growth. Alternative 2 (CP-HPS Phase II Development Project, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge) would avoid Project impacts related to biological resources, water quality, and hazardous materials because the Yosemite Slough bridge would not be constructed. However, because the Yosemite Slough bridge would not be constructed, Alternative 2 would result in increased traffic-related impacts on game days. Alternative 3 (Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians) would reduce Project impacts because development would primarily occur at HPS Phase II, resulting in reduced construction-related impacts and fewer or less substantial operational impacts due to the reduced population and employment growth. Stadium-related impacts including light and glare, traffic, air quality, and noise would be avoided because the stadium would not be constructed. Alternative 4 (Reduced CP-HPS Phase II Development, Historic Preservation, No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge) would reduce the most significant Project impacts to a less-than-significant level (reduced traffic-related air quality and noise impacts, avoidance of historic resource impacts, and avoidance of construction-related impacts to water quality and biological resources because the bridge and marina would not be constructed). Subalternative 4A (CP-HPS Phase II Development Plan with Historic Preservation) would avoid the significant Project impacts to historic resources, but all other impacts would be the same as for the Project. Alternative 5 (Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge) would avoid Project impacts related to biological resources, water quality, and hazardous materials because the Yosemite Slough bridge would not be constructed. However, because the Yosemite Slough bridge would not be constructed, Alternative 5 would result in increased traffic-related impacts resulting from population and employment growth at HPS Phase II. Alternative 4 would be the environmentally superior alternative. However, this Alternative would not meet the objectives to the same extent as the Project.

VI.D.1 Alternatives Considered But Eliminated from Further Analysis in the EIR

A number of alternatives were proposed during the planning and public scoping process for the project. Several of these alternatives were identified by Arc Ecology, a local community organization. In January 2009, Arc Ecology published a report titled *Alternatives for Study, Draft Outline of Issues, Positions, and Alternatives for Public Comment and Further Study* (Arc Ecology Report).[1373]

[1373] Arc Ecology, Draft Alternatives for Study, Draft Outline of Issues, Positions, and Alternatives for Public Comment and Further Study, January 2009.

Alternatives considered, but eliminated from further analysis in the EIR, were evaluated in concept, but were eliminated for one or more factors, including (1) they did not reduce significant environmental effects; (2) they did not achieve most of the basic Project objectives; and/or (3) they were not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors. As stated above, according to CEQA Guidelines Section 15126.6(f)(1), factors that may be considered when a Lead Agency is assessing the feasibility of an alternative include:

> [S]ite suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or the site is already owned by the proponent) (CEQA Guidelines, Section 15126.6(f)(1)).

The alternatives considered but eliminated from further analysis in this EIR include:

- Alternative San Francisco 49ers stadium locations (City of Brisbane or Port of San Francisco sites)
- Alternative land use plans and locations for the 49ers Stadium on HPS Phase II
- Alternative land use plan for Candlestick Point
- Develop Candlestick Point for parks and open space only
- Alternative locations for the Project within the City of San Francisco
- Alternative locations for the Project outside the City of San Francisco

Alternative San Francisco 49ers Stadium Locations

Alternative sites for the 49ers Stadium identified through the process explained above include:

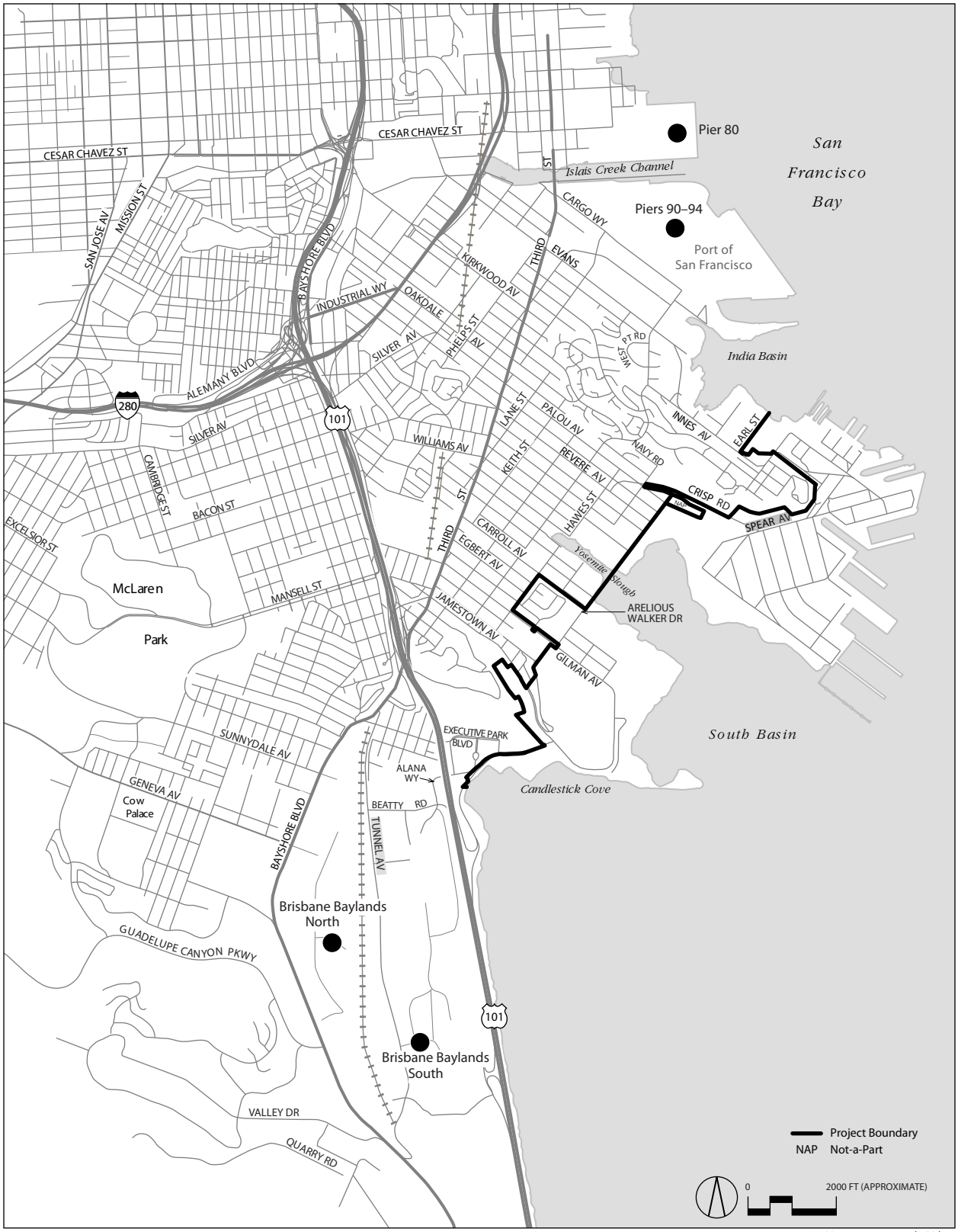
- City of Brisbane
  - > Brisbane Baylands South
  - > Brisbane Baylands North
- Port of San Francisco
  - > Pier 80
  - > Piers 90 to 94 Backlands

All of these sites were evaluated but determined to be infeasible locations for the reasons explained below.

Figure VI-5 (Alternative Off-Site Stadium Locations) illustrates the off-site stadium locations.

City of Brisbane Sites

The City of Brisbane in San Mateo County is completing a planning process for the area known as the Brisbane Baylands, an approximately 659-acre area generally west of US-101, east of the Union Pacific/Caltrain railroad right-of-way, and south of the San Francisco/San Mateo County line.



SOURCE: PBS&J, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE VI-5

Candlestick Point — Hunters Point Shipyard Phase II EIR

ALTERNATIVE OFF-SITE STADIUM LOCATIONS

The Brisbane General Plan currently designates the Brisbane Baylands area as Planned Development–Trade Commercial and in the Commercial Mixed-Use zoning district (C-1 Baylands). The Brisbane Baylands Specific Plan framework, which is the planning document addressing concepts for the Brisbane Baylands, provides the basis for the Phase I Specific Plan that addresses the 446-acre eastern portion of the 659-acre Baylands area.[1374] The Baylands site, now owned by Universal Paragon Corporation (UPC) is located on the former Southern Pacific Railroad Yard and former landfill sites. The Phase I Specific Plan proposes approximately 107 acres of commercial, 68 acres of office/institutional, 118 acres of aquatic open space, 99 acres of upland open space/open area, and 54 acres of right-of-way streets and infrastructure for this area. The plan also addresses basic parameters for circulation, land use, open space, infrastructure, and utilities for potential future development of the larger 659-acre area, including the Phase I Specific Plan area and adjacent properties generally situated to the west, between the Caltrain rail line and Bayshore Boulevard. UPC also owns the Schlage Lock site north of the Brisbane Baylands Specific Plan area in San Francisco.[1375] The 2006 Specific Plan is continuing to go through public review, and the City of Brisbane is preparing a Draft Environmental Impact Report for the plan.

The Arc Ecology Report identified two sites within the Brisbane Baylands area for alternative stadium locations because the sites are large and undeveloped, with freeway and transit access. One is within the Brisbane Baylands Phase I Specific Plan area (Brisbane Baylands South). The second site is within the Brisbane Baylands Future Phase area (Brisbane Baylands North). As noted, both of those sites are generally designated for Planned Development–Trade Commercial in the Brisbane General Plan and are located in the Commercial Mixed-Use zoning district (C-1 Baylands). The Brisbane Baylands Phase I Specific Plan designates the Brisbane Baylands South site for office and institutional uses. The Brisbane Baylands Framework Plan designates the Brisbane Baylands North site for commercial, office, and service industrial uses.

The Brisbane Baylands locations are not considered feasible sites for the 49ers stadium for the following reasons:

- The Baylands Specific Plan, although not yet formally adopted, does not include a stadium as an allowed use in either the northern or southern portions of the site. Both sites are designated for commercial, office, institutional, and industrial uses. While planning considerations in a particular jurisdiction can evolve over time, it is expected that the range of uses identified in the Phase I Specific Plan reflect Brisbane's long-term planning goals for the Brisbane Baylands, which plans do not include developing a professional football stadium.
- The Brisbane sites are outside of the City and County of San Francisco. Planning review, and approval of a stadium in Brisbane Baylands would be subject to City of Brisbane jurisdiction. Neither the San Francisco Redevelopment Agency (Agency), the City and County of San Francisco, nor Lennar Urban would reasonably be able to acquire, control, or otherwise have access to a Brisbane site for the purpose of pursuing such alternative locations. Thus, the Brisbane Baylands sites were determined to be infeasible for development of the stadium, and were rejected from further consideration in the EIR.

[1374] City of Brisbane, Initial Study for the Brisbane Baylands Phase I Specific Plan, February 26, 2006.
[1375] The Schlage Lock site is not part of the Brisbane Baylands Specific Plan area. This site is within the Visitacion Valley Redevelopment Project Area and is programmed for mixed-use development, including approximately 1,250 residential units.

Port of San Francisco Sites

The Port of San Francisco (Port) controls approximately 7.5 miles of San Francisco's waterfront, generally extending from Fisherman's Wharf to India Basin. The Port's property consists of former public tidelands, which are held in "Public Trust." The Port oversees a broad range of commercial, maritime, and public activities on the public trust property. The "public trust" is a legal doctrine that governs the use of tide and submerged lands, including former tide and submerged lands that have been filled. Public trust lands are required to be used for public trust purposes, which include navigation, fisheries, waterborne commerce, natural resource protection, and water-related uses that attract the public to use and enjoy the waterfront.[1376] The Waterfront Land Use Plan was initially adopted by the Port in 1997 and defines acceptable uses, policies, and land use information applicable to properties under the Port's jurisdiction.[1377]

The Arc Ecology report identified two sites for alternative stadium locations, including Pier 80 and the backlands of Piers 90 to 94. Arc Ecology recommended the alternative stadium sites on Port property because the sites are large, with freeway and transit access. Development of a stadium at either site would also generate minimal traffic through residential neighborhoods (refer to Figure VI-5). Both sites are part of the Port's Piers 80–96 Maritime Cargo area and are reserved for port and industrial uses.

The Maritime Cargo area is the Port's last remaining Maritime Cargo handling facility and is a critical component to the Port's State-mandated mission of providing and supporting maritime commerce, navigation and fishery uses. The Maritime complex area was identified in the Waterfront Land Use Plan for cargo uses because of the significant investment the State, the Port, and the City have spent on the cargo facilities, supporting infrastructure, and related transportation infrastructure. Included in this investment is the recently completed $27 million multi-modal Illinois Street freight rail bridge, designed to support on-dock freight rail access and to improve the connection between the active cargo piers. Each of the remaining cargo facilities services a unique but inter-related cargo role. Pier 80 is the last remaining Bay Area breakbulk cargo terminal, facilitating the movement of goods such as steel, lumber, machine parts, and other cargos not suitable to be shipped in a container.[1378] Piers 90 to 94 are used to import bulk cargos such as sand and aggregate. Combined, the complex supports nearly all of the construction-related activities in San Francisco, the San Francisco Peninsula, and beyond that rely on steel, concrete, and aggregate supplies for construction of buildings and infrastructure. In addition to the important role the Port facilities play in supporting infrastructure and new development projects, they employ a high number of high-paying production, distribution, and repair (PDR) workers.[1379]

The San Francisco Bay Area Seaport Plan, co-authored by the San Francisco Bay Conservation Development Commission (BCDC) and the Metropolitan Transportation Commission (MTC), designates these facilities for Port Priority Use, and calls for these facilities to be retained to support cargo operations. The Port's Piers 80–96 facilities are some of the last remaining lands available in the City for heavy

[1376] California State Lands Commission, Public Trust Policy. http://www.slc.ca.gov/Policy_Statements/Public_Trust/Public_Trust_Policy.pdf (accessed online July 23, 2009).
[1377] Port of San Francisco, Waterfront Land Use Plan, adopted June 1997 and as amended.
[1378] Break-bulk cargo is a shipping term for any loose material that must be loaded individually, not in shipping containers or in bulk as with oil or grain.
[1379] David Beaupre, Planning and Development, Port of San Francisco, Email correspondence with Wells Lawson, Mayor's Office of Economic and Workforce Development, May 1, 2009.

industrial uses and are largely port-related industrial uses that are water-dependent or relate to or support the adjacent water-dependent uses.

Sports facilities, such as the San Francisco 49ers stadium, are not considered allowable uses at either site under the Waterfront Land Use Plan. Both sites considered are State Tidelands subject to the Public Trust, which restricts the types of allowable uses. Public recreation and assembly uses are consistent with the Public Trust. However, Proposition H, a ballot measure adopted by voters in 1990, imposed criteria for consideration of "non-maritime" uses. Under Proposition H, sports facilities with seating capacity greater than 22,000 seats, such as a new 49ers football stadium, would be subject to approval by voters at a public election.[1380]

The Port locations are not considered feasible sites for the 49ers stadium for the following reasons:

- A stadium would displace maritime-dependent cargo handling and industrial uses not available or feasible elsewhere in San Francisco.
- Sports facilities are not allowable uses at either site under the Waterfront Land Use Plan.
- A stadium use at either site would be subject to approval by voters at a public election.

Thus, the Port sites were determined to be infeasible for development of the stadium and were rejected from further consideration in the EIR.

Alternative Land Use Plans and Locations for the 49ers Stadium at HPS Phase II

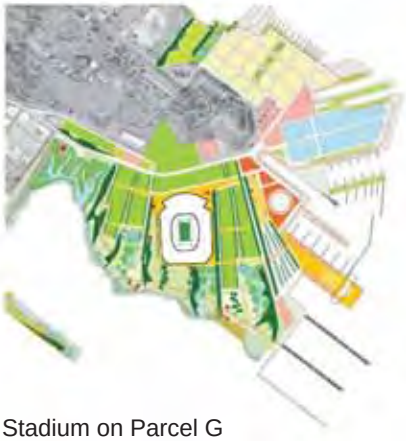
Five alternative land use plans were proposed by Arc Ecology and studied in concept for this document. They include proposals to locate the stadium on Parcels B, C, and G of HPS Phase II; one proposal with no stadium at HPS Phase II; and one alternative land use plan for Candlestick Point. All of the Arc Ecology alternative land use plans for HPS Phase II and Candlestick Point are within the same Project site boundaries and assume a development program similar to the Project with the intent of improving economic, social, and environmental benefits compared to the Project. Figure VI-6 (Arc Ecology Alternative Land Use Plans) illustrates the alternative land use plans. The alternatives are based on the following concepts:

- Connect the waterfront to existing neighborhoods and open space areas.
- Transfer State and City parkland to improve overall distribution and quality of open space areas.
- Identify geologic constraints to determine suitable building sites.
- Develop an urban waterfront park with contiguous ecological habitats in conjunction with programmed open space areas.
- Connect existing habitats in the Project site and vicinity.
- Develop neighborhood-serving parks with programmed uses and low-impact design techniques to provide on-site stormwater treatment.
- Create a bicycle and pedestrian network connecting new and existing neighborhoods to park and open space facilities.

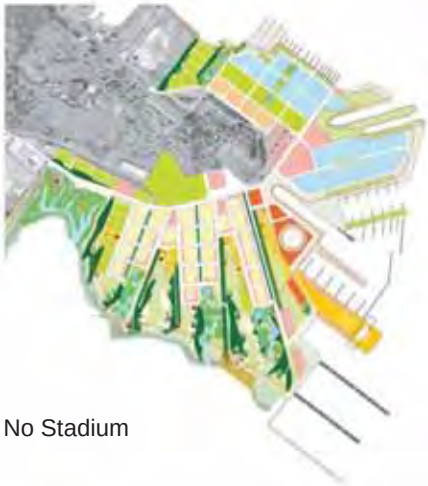
[1380] Port of San Francisco, Waterfront Land Use Plan, adopted June 1997 and as amended.

Stadium parcel B

Stadium on Parcel C



Stadium on Parcel G



No Stadium

Candlestick Point

SOURCE: Arc Ecology Alternatives for Study, January 2009.

PBS&J 10.23.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

ARC ECOLOGY ALTERNATIVE LAND USE PLANS

FIGURE VI-6

To the extent that the Arc Ecology alternatives present a mix of uses and at an intensity similar to the Project, including residential, commercial, research and development (R&D), cultural and entertainment, hotel, sports fields, and open space areas, these alternatives can be expected to have impacts similar to the Project. The alternatives for HPS Phase II also present new uses, including an industrial maritime facility, museum, festival and performance venue, driving range, cultural plaza/sculpture park, and solar arrays on Piers 1 and 2. Generally, these new uses would result in impacts similar to or greater than the Project. All of the Arc Ecology alternatives include an upland roadway connection between Candlestick Point and HPS Phase II and no Yosemite Slough bridge. In this regard, the Arc Ecology alternatives are similar to Alternatives 2, 4, and 5 analyzed above, all of which do not include the Yosemite Slough bridge. All HPS Phase II alternatives would include open space uses along the shoreline of Parcels E and E-2 and the north end of Parcel B, the same as the Project. All of the alternatives would also include a 20,000-seat arena and marinas along the shorelines of Parcels B, C, and D, compared to the 10,000-seat arena on Candlestick proposed as part of the Project, a component of these alternatives that would potential increase, not decrease impacts compared to the Project.

Overall, the Arc Ecology land use alternatives are rejected because they do not reduce or avoid environmental effects of the Project in ways different from the Alternatives examined above. A more detailed explanation is included below for why each of these proposals was rejected from further consideration in this document.

Stadium on Parcel B

This alternative would generally be within the same HPS Phase II site boundaries and follow a development program similar to the Project. Compared to the Project, this Alternative would relocate residential uses from Parcel B to Parcels E and G, and the stadium would be located on Parcel B. R&D uses would be north of Crisp Road and would be reduced at HPS Phase II compared to the Project. Additional R&D uses could be accommodated at Candlestick Point. Stadium parking would be on dual-use fields west of the stadium on Parcel B and to the south on Parcel C. A 20,000-seat arena would be on Parcel D as opposed to the 10,000-seat arena proposed at Candlestick Point under the Project.

The proposal would not reduce any impacts from the project except those associated with constructing and operating the Yosemite Slough bridge, a component of Alternatives 2, 4, and 5. With an assumed development of the same magnitude as the Project, most construction impacts would not be reduced, including, but not necessarily limited to, impacts on archaeological resources, air quality, noise, geology and soils, hydrology and water quality, and biological resources. Construction of this alternative would require the same shoreline improvements as the Project to ensure public safety, resulting in impacts similar to the Project. Impacts to biological resources related to construction of the Yosemite Slough bridge would be avoided because no bridge would be constructed. Construction of a marina along the shoreline of Parcels B, C, and D could result in impacts to aquatic resources and water quality, similar to the Project, but with an additional marina at Parcel B. Buildings 211, 231, and 253 at HPS Phase II, have been determined eligible for the California Register of Historic Resources (CRHR) and are contributors to the Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. Development of the dual-use fields on Parcel C would require demolition of those buildings, similar to the Project.

The proposal to locate residential uses on Parcel Parcels E and G, could result in additional impacts from hazardous materials remediation, since the Navy's remedial program is designed to remediate the property to a level that would allow for uses as set out in the 1997 HPS Redevelopment Plan, which generally calls for non-residential uses on Parcels E and G. Construction of housing on Parcels E and G would require the property owner to go through the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) process to obtain approval from the Regulatory Agencies to use that area for a residential use. Depending on the outcome of the CERCLA process, further remediation and/or property controls could be required, potentially resulting in additional impacts that could result from exposure to hazardous materials during the remediation process as compared to the Project.

Because the development program of this alternative would be the same or similar to the Project, operational impacts would not be reduced, including impacts to land use, population, housing and employment, aesthetics, shadow, wind, air quality, noise, public services, utilities, energy, and secondary land use, with the exception of those operational impacts avoided with the elimination of the Yosemite Slough bridge. Significant traffic, noise, and air quality impacts would not be reduced, including impacts from daily operations and game days. The stadium on HPS Phase II Parcel B with this alternative would result in game day traffic patterns different from those that would occur with the Project. Section III.D identified routes subject to additional congestion during post-game conditions with the Project. (Refer to Table III.D-23 [Locations of Congestion Following San Francisco 49ers Football Game].) With this alternative, the primary transportation route to the stadium would be from Third Street, via Cargo Way, Evans Avenue, and Innes Avenue, with lesser volumes on the Harney Way, Gilman Avenue, or Paul Avenue corridors compared to the Project. This alternative could therefore result in additional game-day traffic impacts on those corridors, exacerbating vehicle congestion during post-game conditions compared to the Project. In addition, with no Yosemite Slough bridge, this alternative would result in greater transportation-related impacts on game days because vehicular traffic to and from the stadium would be delayed, and traffic levels would be further increased on local streets, including Innes Avenue, Evans Avenue, and Ingalls Street.

Operation of a 20,000-seat arena on HPS Phase II Parcel D could increase traffic-related impacts from arena events because the arena capacity would be doubled compared to the Project. Also, the arena on the HPS Phase II site instead of at Candlestick Point could increase arena-related traffic impacts at intersections along the Innes Avenue, Evans Avenue, and Cargo Way corridors to Third Street, compared to the Project.

The Stadium on Parcel B Alternative would reduce biological impacts of the Project that are associated with the Yosemite Slough bridge but in other respects this proposal has the same or greater impacts as compared to the Project. Alternatives that do not include the Yosemite Slough bridge are included above. This alternative is rejected as either similar to alternatives examined or similar to the project and, therefore, offering no environmental benefits not considered in the Alternatives analysis.

Stadium on Parcel C

This alternative is generally the same as the Stadium on Parcel B, except the stadium would be located on Parcel C and parking for the stadium would be located on Parcel B. This proposal would have the same impacts as the Stadium on Parcel B proposal and is rejected for the same reasons as explained above for Stadium on Parcel B.

Stadium on Parcel G

This alternative would generally be within the same HPS Phase II site boundaries and follow a development program similar to the Project. This alternative is also similar to Alternative 2 (CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge). Compared to the Project and Alternative 2, the Arc Ecology stadium on Parcel G Alternative the stadium would be moved west to Parcels E and G and a 20,000-seat arena would be east of the stadium on Parcel D. Stadium parking would be on dual-use fields surrounding the stadium. Residential uses would be on Parcel B and R&D uses on Parcel C. This proposal does not reduce or avoid environmental impacts in a substantially different way than Alternative 2 and for this reason is rejected from further consideration. CEQA does not require analysis of every alternative, just a reasonable range of alternatives and an alternative similar to this proposal is examined in detail above.

No Stadium at HPS Phase II

This alternative would generally be within the same HPS Phase II site boundaries and follow a development program similar to the Housing Variant. The Arc Ecology No Stadium Alternative would include a mix of residential, commercial, R&D, cultural, and open space uses. Residential uses would be on Parcels D, E, and G, with commercial uses distributed throughout the site. R&D uses would be on Parcels B and C and an educational campus would be located on Parcel C, which is different from the Project and Housing Variant. A 20,000-seat arena would be east of the stadium on Parcel D.

This proposal is similar to Alternatives 1, 3, and 5 that consider no stadium at HPS Phase II. The Housing Variant and R&D Variant also address the no stadium scenario.

With an assumed development of the same magnitude as the Housing Variant, this proposal would have similar construction and operational impacts. Impacts to biological resources related to construction of the Yosemite Slough bridge would be avoided because no bridge would be constructed, but Alternative 2, 4 and 5 also proposed alternatives without the Yosemite Slough bridge.

Operation of the 20,000-seat arena on Parcel D could increase traffic-related impacts from arena events as described above, which would not result in reduced or avoided impact, the goal in selecting CEQA alternatives.

This alternative was rejected because it is essentially duplicative of several development programs analyzed in this EIR and would not result in reduced or avoided impacts not already identified in alternatives considered above.

Alternative Land Use Plan for Candlestick Point

This alternative would generally be within the same Candlestick Point site boundaries and follow a development program similar to the Project. The Arc Ecology Candlestick Point Alternative land use plan would include a mix of residential, commercial, R&D, cultural, and open space uses.

A main concept of this Arc Ecology alternative is to connect existing open space areas at Candlestick Point to the CPSRA. Wildlife and vegetation corridors would connect the shoreline to inland open space areas. Section III.N identifies that there is localized movement between Bayview Hill and the CPSRA. However,

it is concluded that the Project would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors.

With an assumed development of the same magnitude as the Project, construction and operational impacts are generally similar. As this alternative is not substantially different from a Project Variant, it was rejected from further consideration in this EIR.

Individual Alternative Land Uses at Candlestick Point and HPS Phase II

The Arc Ecology report identified additional alternative land uses and concepts for development at Candlestick Point, HPS Phase II, and improvements to areas outside of the Project site. Table VI-11 (Summary of Arc Ecology Land Uses and Concepts for Candlestick Point and HPS Phase II) outlines those concepts and includes a comparison to Project features and impacts. To the extent that these are duplicative of Project or Alternative components, impacts associated with these concepts are analyzed in Chapter III or this Chapter VI. Reasons for rejecting other concepts are explained below.

Table VI-11 Summary of Arc Ecology Land Uses and Concepts for Candlestick Point and HPS Phase II

Arc Ecology Alternative Proposal (Page #)[a]	*Relationship to Project Impacts*
Locate PDR businesses at Candlestick Point (117)	Arc Ecology proposes PDR uses at Candlestick Point near existing and new residential uses as a potential relocation area for PDR uses displaced by the Arc Ecology proposal to day light Yosemite Creek. The Project does not propose PDR uses, nor does it propose displacement of existing PDR uses. PDR uses at Candlestick Point could result in different and/or additional traffic-related impacts. Operational noise and air quality impacts could also occur, including impacts to sensitive receptors due to the proximity of existing and proposed residential uses. Therefore, locating PDR uses at Candlestick Point would not reduce impacts compared to the Project.
Locate outlets and regional retail at Candlestick Point (117)	Regional retail is proposed at Candlestick Point under the Project. Addition of outlet retail at Candlestick Point would not reduce impacts compared to the Project. The Arc Ecology proposed location of retail would make the uses more visible from northbound US-101. However, this alternative location would not reduce construction or operational impacts of such uses compared to the Project.
Move arena to HPS from Candlestick Point (80, 82, 84, and 86) Expand arena from 10,000 to 20,000 seats (38)	Operation of the 20,000-seat arena on Parcel D could increase traffic-related impacts from arena events because the capacity would be doubled compared to that proposed under the Project and the location would result in generation of additional trips to HPS Phase II. This could increase traffic-related impacts at intersections along the Third Street corridor, compared to the Project.
Shared parking on HPS (throughout plans)	Shared parking at HPS Phase II is proposed under the Project, including dual-use sports fields. Implementation of shared parking at HPS Phase II would not reduce construction or operational impacts compared to the Project.
Maritime industrial uses at HPS (106–107, 114)	Maritime industrial uses are not proposed under the Project. Construction and operation of such uses at HPS Phase II could result in new impacts including, but not necessarily limited to, impacts on air quality, noise, hydrology and water quality, and biological resources.
Indoor sports facility at HPS (80, 103, 111–116)	An indoor sports facility is not specifically proposed under the Project. Construction and operation of an indoor sports facility at HPS Phase II would not reduce impacts compared to the Project. However, such uses are not precluded by the Project.
Move multi-plex cinema to HPS from Candlestick Point (105)	The Project would include a theater at Candlestick Point. Relocating the theater to HPS Phase II would not reduce impacts compared to the Project.

Table VI-11 Summary of Arc Ecology Land Uses and Concepts for Candlestick Point and HPS Phase II

Arc Ecology Alternative Proposal (Page #)[a]	*Relationship to Project Impacts*
Move sports fields closer to neighborhood residences (120)	The Project proposes sports fields at HPS Phase II, primarily surrounding the stadium on dual-use fields. Locating the sports fields closer to residential uses at Candlestick Point or HPS Phase II would not reduce impacts compared to the Project. In addition, locating sports fields in close proximity to residential uses could result in land use conflicts related to noise and nighttime lighting.
Open space link from Third Street to the Bay along Yosemite Slough (122–129) Daylight Yosemite Slough (124–129)	Providing an open space connection from Third Street to the Bay along Yosemite Slough and day lighting of Yosemite Slough west of its current terminus is outside of the Project site. Implementation of such improvements would not reduce impacts of the Project. Instead it would expand the scope of the Project and could result in additional environmental impacts.
Widen waterfront habitat corridors (41) Create habitat corridors to inland open space (41,48,59,64) Reorient Alice Griffith Park to connect with slough (96–99)	Wildlife and vegetation corridors would connect the shoreline to inland open space areas. Section III.N (Biological Resources) identifies that there is localized movement between Bayview Hill and the CPSRA. However, the Project would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors. Therefore, widening and reorientation of vertical development would not reduce impacts to wildlife movement compared to the Project.
Provide concession stands in park (throughout plans)	This concept locates park concession stands and other attractions throughout the parks and open space facilities. Construction and operation of such uses would not reduce impacts compared to the Project. However, such uses are not precluded by the Project.
Transfer City land to State Parks (59)	Transfer of City land to State Parks is a policy decision and would not reduce any environmental impacts compared to the Project. An alternative analysis is provided below that evaluates development of only parks and open space at Candlestick Point.
CPSRA nature interpretive center (40)	This use is not precluded by the Project but also does not appear to address any specific environmental impact of the Project. State Parks is undertaking a separate planning process for its park, which will be the vehicle for determining the details of park design.
Alternative Routes to bridge over slough (130)	Alternatives 2, 3, and 4 in this EIR analyze upland transportation routes with no bridge crossing Yosemite Slough.
Alternative urban forms and development layout (60) Extend existing street grid (60) Radial geometry from existing topographic features, land marks and constructed shoreline (60)	The Project does include some of these urban design concepts, such as extending the existing street grid into Candlestick Point. The proposed urban design concepts would not reduce impacts compared to the Project.
Water management: constructed treatment wetlands, storm water retention and irrigation storage ponds (47, 50, 124) Integrated resource conservation with open space systems (50)	The Project incorporates various forms of stormwater management, including vegetated swales, flow-through planter boxes, permeable pavement, green rooftops, and rainwater cisterns. Bioretention basins would also be constructed within parks and open space. The Project would provide a network of reclaimed water mains for dual plumbing in commercial buildings and for irrigation of landscaped areas. Much of these design elements would be incorporated into open space areas. Incorporating additional conservation measure beyond what is already proposed would not further reduce impacts compared to the Project.
Solar arrays on Piers 1 and 2 (38, 80)	Installation of solar arrays on piers is not proposed under the Project. The feasibility of such installations is unknown. New impacts to biological resource impacts could occur, including impacts to waterbirds that roost in large numbers on piers on HPS Phase II. However, installation of solar arrays could reduce energy impacts by providing more local electricity generation.

Table VI-11 Summary of Arc Ecology Land Uses and Concepts for Candlestick Point and HPS Phase II

Arc Ecology Alternative Proposal (Page #)[a]	*Relationship to Project Impacts*
Remove the capped landfill on parcel E2 and replace it with a constructed treatment wetland (32)	Cleanup of Parcel E-2 is not a part of the Project. Cleanup of Parcel E-2 is the Navy's responsibility, as governed by the HPS status as a Superfund site under CERCLA. Moreover, the Project does not propose the transfer of Parcel E-2 until the CERCLA regulatory oversight agencies determine that this parcel is safe for the planned uses. Removing the landfill would not reduce any environmental impacts of the Project.

SOURCE: PBS&J and Arc Ecology, *Draft Alternatives for Study, Draft Outline of Issues, Positions, and Alternatives for Public Comment and Further Study*, January 2009.

a. Page number of Arc Ecology *Draft Alternatives for Study*, January 2009.

Develop Candlestick Point for Parks and Open Space Only

Under this alternative, the majority of Candlestick Point would be developed as a park and open space, assuming the San Francisco 49ers stadium is constructed at HPS Phase II or elsewhere. The entire CPSRA would remain under the jurisdiction of the California Department of Parks and Recreation (CDPR). Candlestick Park and the surrounding area would remain in the Public (P) zoning district, which permits public uses and facilities. This alternative would reduce construction-related impacts of the Project, as less development would occur on the Candlestick Point site. It would reduce or avoid many of the operational Project impacts. However, this alternative would meet few, if any, of the Project objectives, including creation of a range of job and economic development opportunities. In addition, this alternative would most likely have to be funded and developed by the City. Finally, the feasibility of phasing land development at Alice Griffith to allow residents to move directly into new homes would be compromised under this scenario.

Alternative Locations for the Project outside the City of San Francisco

This alternative would involve development of the Project on a site outside of the City. If feasible, development of the Project at another location could reduce site-specific impacts to biological resources (e.g., no bridge-related construction impacts) and cultural resources (e.g., demolition of historic resources at HPS Phase II); however, it would not reduce or avoid Project impacts associated with construction (e.g., air quality and noise) or operation (e.g., traffic, air quality, and noise). In fact, this alternative, while it would remove significant impacts from vehicular traffic on City streets in the Project area, it would shift these impacts to other jurisdictions. Although this alternative would reduce potentially adverse site-specific impacts that could conceivably be avoided at other sites, if site of this size could be found available, development at a location outside the City would fail to meet any of the Project objectives. Developing the Project outside the City would not provide benefit to the citizens of the Bayview neighborhood or San Francisco.

Alternative Locations for the Project within the City of San Francisco

This alternative would involve development of the Project on a site outside of the Bayview Neighborhood, but still within the City; however, there are no vacant parcels or designated redevelopment areas large enough (at least 702 acres) to accommodate the Project. Development of the Project at another location would not reduce or avoid the significant impacts associated with construction of the Project (e.g., air and noise), or the operational impacts of the Project (e.g., traffic, air quality, and noise).

VI.E COMPARISON OF ALTERNATIVES

Table VI-12 (Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives) identifies the significant and unavoidable impacts of the Project and identifies whether any of the alternatives lessens or avoids those impacts. The table identifies whether the alternatives result in the same (=), lesser (<), or greater (>) impacts as compared to the Project. The table also provides the level of significance for the Project and the Alternatives after the implementation of all feasible mitigation measures.

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
Impact TR-1 The Project would result in construction-related transportation impacts in the Project vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Project vicinity. Mitigation measure MM TR-1 would reduce but not avoid construction-related transportation impacts during construction activities. Therefore, construction transportation impacts would remain significant.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-2 Implementation of the Project would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts. Although implementation of a Travel Demand Management Plan was assumed in developing Project travel demand estimates, and would be essential to ensure that impacts at additional locations do not occur, traffic congestion caused by the Project and the Project's contribution to cumulative impacts would still be significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-3 The Project would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Project vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-4 At the intersection of Tunnel/Blanken, the Project would result in significant Project AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Project	=	=	<	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-5 Project contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-6 Project contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-8 Project contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-10 The Project would result in significant Project traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-11 The Project would contribute to significant cumulative traffic impacts at four freeway segments. No feasible mitigation is available.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-12 The Project would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-13 The Project would contribute to significant cumulative traffic impacts at 12 freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-14 The Project would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-15 The Project would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-21 The Project would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Project impacts and Project contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-22 The Project would increase congestion and contribute to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Implementation of mitigation measure MM TR-22.1 and MM TR-22.2 would reduce impacts to transit operations. However, since feasibility of MM TR-22.1 is uncertain, and since MM TR-22.2, without MM TR-22A, would reduce, but not completely avoid, impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy, Project impacts and Project contributions to cumulative impacts on the these lines would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-23 The Project would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Project impacts and Project contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-24 The Project would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Project impacts and Project contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-25 The Project would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-26 The Project would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Project impacts and Project contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-27 The Project would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Project impacts and Project contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-28 The Project would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101. No feasible mitigation has been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-30 The Project would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-32 The Project's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
Impact TR-38 For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Impact TR-39 The existing game day service and Project transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Impact TR-46 Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact TR-47 The existing transit service and Project improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Impact TR-51 Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Project conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Project	<	=	<	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Impact TR-52 Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations. Implementation of mitigation measure MM TR-23.1 would reduce impacts to less than significant. Due to the uncertainty of this mitigation the impact would remain significant.					
Significance of Alternative Compared to Project	<	=	<	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
AIR QUALITY					
Impact AQ-4 Operation of the Project would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out in the year 2029.					
Significance of Alternative Compared to Project	<	=	<	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
NOISE					
Impact NO-2 Construction activities associated with the Project would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the Project's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Project	=	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-12 Comparison of the Significant and Unavoidable Impacts of the Project to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Impact NO-3 Construction activities associated with the Project would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact NO-6 Operation of the Project would generate increased local traffic volumes that could cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Project	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Impact NO-7 Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Project	<	=	<	<	<
Level of Significance after Mitigation (Project/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
CULTURAL RESOURCES					
Impact CP-1 Construction activities associated with the Project could result in a substantial adverse change in the significance of a historical resource.					
Significance of Alternative Compared to Project	=	=	=	<	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/LTS	SU/SU

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

Because this EIR includes variants to the Project, any one of which could be approved instead of or in combination with the Project, Table VI-13 (Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives) through Table VI-17 (Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Shared Stadium Variant) identify the significant and unavoidable impacts of the variants and identify whether any of the alternatives lessens or

avoids those impacts. The tables identify whether the alternatives result in the same (=), lesser (<), or greater (>) impacts as compared to the variants. The table also provides the level of significance for the Project and the variants after the implementation of all feasible mitigation measures.

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
The R&D Variant would result in construction-related transportation impacts in the R&D Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the R&D Variant vicinity.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the R&D Variant would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would result in significant impacts and would contribute to significant cumulative impacts at intersections in the R&D Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
At the intersection of Tunnel/Blanken, the R&D Variant would result in significant Project AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
R&D Variant contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	<	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The R&D Variant's contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
R&D Variant contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would result in significant traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would contribute to significant traffic impacts on freeway conditions.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would contribute to significant cumulative traffic impacts at freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The R&D Variant would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Project impacts and Project contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion and contribute to cumulative conditions at intersections, which would increase travel times and impact transit operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Feasibility of mitigation measures is unclear or would not completely avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Project impacts and Project contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, R&D Variant impacts and R&D Variant contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The R&D Variant would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Project impacts and Project contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Project impacts and Project contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The R&D Variant's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
The existing game day service and transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
The existing transit service and R&D Variant improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under R&D Variant conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under R&D Variant conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
AIR QUALITY					
Operation of the R&D Variant would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
NOISE					
Construction activities associated with the R&D Variant would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before Project construction activity on adjacent parcels is complete. Although the R&D Variant's construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Construction activities associated with the R&D Variant would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Operation of the R&D Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
CULTURAL RESOURCES					
The R&D Variant would result in a substantial adverse change in the significance of a historical resource. Implementation of mitigation measure MM CP-3b would reduce the impact, but not to a less-than-significant level. The impact would be significant and unavoidable.					
Significance of Alternative Compared to Variant	<	=	=	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/LTS	SU/SU

Table VI-13 Comparison of the Significant and Unavoidable Impacts of Variant 1: No Stadium, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact
a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
The Housing Variant would result in construction-related transportation impacts in the Housing Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Housing Variant vicinity.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the Housing Variant would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Housing Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
At the intersection of Tunnel/Blanken, the Housing Variant would result in significant Project AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Housing Variant contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant's contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Housing Variant contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would result in significant traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would contribute to significant traffic impacts on freeway conditions.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing Variant would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would contribute to significant cumulative traffic impacts at freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Project impacts and Project contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion and contribute to cumulative conditions at intersections, which would increase travel times and impact transit operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Feasibility of mitigation measures is unclear or would not completely avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing Variant would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Project impacts and Project contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Housing Variant impacts and Housing Variant contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Project impacts and Project contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Project impacts and Project contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing Variant would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
The existing game day service and transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The existing transit service and Housing Variant improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Housing Variant conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Housing Variant conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
The Housing Variant would result in construction-related transportation impacts in the Housing Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Housing Variant vicinity.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the Housing Variant would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Housing Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
At the intersection of Tunnel/Blanken, the Housing Variant would result in significant Project AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Project/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Housing Variant contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	<	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would contribute to significant traffic impacts on freeway conditions.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion and contribute to cumulative conditions at intersections, which would increase travel times and impact transit operations of the 23-Monterey, 24-Divisadero and the 44-O'Shaughnessy. Feasibility of mitigation measures is unclear or would not completely avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing Variant would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing Variant's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Housing Variant conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Housing Variant conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
AIR QUALITY					
Operation of the Housing Variant would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
NOISE					
Construction of the Housing Variant would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before construction activity on adjacent parcels is complete. Although the construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14 Comparison of the Significant and Unavoidable Impacts of Variant 2: No Stadium, Relocation of Housing to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Construction activities associated with the Housing Variant would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Operation of the Housing Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
CULTURAL RESOURCES					
The Housing Variant would result in a substantial adverse change in the significance of a historical resource. Implementation of mitigation measure MM CP-3b would reduce the impact, but not to a less-than-significant level. The impact would be significant and unavoidable.					
Significance of Alternative Compared to Variant	<	=	=	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/LTS	SU/SU

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

Table VI-14a Comparison of the Significant and Unavoidable Impacts of Variant 2A: Housing/R&D Variant, No Stadium, Relocation of Housing, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
The Housing/R&D Variant would result in construction-related transportation impacts in the Housing/R&D Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Housing/R&D Variant vicinity.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the Housing/R&D Variant would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Housing/R&D Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
At the intersection of Tunnel/Blanken, the Housing/R&D Variant would result in significant Project AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Housing/R&D Variant contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Project conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant's contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Housing/R&D Variant contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Project conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14a Comparison of the Significant and Unavoidable Impacts of Variant 2A: Housing/R&D Variant, No Stadium, Relocation of Housing, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge All*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing/R&D Variant would result in significant traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would contribute to significant traffic impacts on freeway conditions.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would contribute to significant cumulative traffic impacts at freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Project impacts and Project contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14a Comparison of the Significant and Unavoidable Impacts of Variant 2A: Housing/R&D Variant, No Stadium, Relocation of Housing, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing/R&D Variant would increase congestion and contribute to cumulative conditions at intersections, which would increase travel times and impact transit operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Feasibility of mitigation measures is unclear or would not completely avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Project impacts and Project contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Housing/R&D Variant impacts and Housing/R&D Variant contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Project impacts and Project contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14a Comparison of the Significant and Unavoidable Impacts of Variant 2A: Housing/R&D Variant, No Stadium, Relocation of Housing, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge All*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Housing/R&D Variant would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Project impacts and Project contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Project would also contribute to cumulative impacts on these transit routes on US-101.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Housing/R&D Variant's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/NI	SU/NI
The existing game day service and transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/NI	SU/NI

Table VI-14a Comparison of the Significant and Unavoidable Impacts of Variant 2A: Housing/R&D Variant, No Stadium, Relocation of Housing, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Project conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
The existing transit service and Housing/R&D Variant improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Housing/R&D Variant conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Housing/R&D Variant conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/SU	SU/SU
Sell-out weekday evening events at the arena could impact existing and proposed transit service.					
Significance of Alternative Compared to Variant	<	=	<	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/SU	SU/SU
AIR QUALITY					
Operation of the Housing/R&D Variant would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
NOISE					
Construction of the Housing/R&D Variant would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before construction activity on adjacent parcels is complete. Although the construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-14a Comparison of the Significant and Unavoidable Impacts of Variant 2A: Housing/R&D Variant, No Stadium, Relocation of Housing, Additional R&D to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Construction activities associated with the Housing/R&D Variant would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Operation of the Housing/R&D Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that could adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Variant	=	>	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	NI/NI	NI/SU	NI/NI	NI/NI	NI/NI
CULTURAL RESOURCES					
The Housing/R&D Variant would result in a substantial adverse change in the significance of a historical resource. Implementation of mitigation measure MM CP-3b would reduce the impact, but not to a less-than-significant level. The impact would be significant and unavoidable.					
Significance of Alternative Compared to Variant	<	=	=	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/LTS	SU/SU

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement: No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
The Tower Variants would result in construction-related transportation impacts in the Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Variant vicinity. Mitigation measure MM TR-1 would reduce but not avoid construction-related transportation impacts during construction activities. Therefore, construction transportation impacts would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the Tower Variants would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts. Although implementation of a Travel Demand Management Plan was assumed in developing Variant travel demand estimates, and would be essential to ensure that impacts at additional locations do not occur, traffic congestion caused by the Variant and the Variant's contribution to cumulative impacts would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
At the intersection of Tunnel/Blanken, the Tower Variants would result in significant AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Tower Variants contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Variant conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Tower Variants contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Variant conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Tower Variants contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Variant conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would result in significant Tower Variants traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would contribute to significant cumulative traffic impacts at four freeway segments. No feasible mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would contribute to significant cumulative traffic impacts at 12 freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Tower Variants would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Variant impacts and Variant contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion and contribute to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Implementation of mitigation measure MM TR-22.1 and MM TR-22.2 would reduce impacts to transit operations. However, since feasibility of MM TR-22.1 is uncertain, and since MM TR-22.2, without MM TR-22A, would reduce, but not completely avoid, impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy, Variant impacts and Variant contributions to cumulative impacts on the these lines would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Variant impacts and Variant contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Variant impacts and Variant contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Tower Variants would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Variant impacts and Variant contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Variant impacts and Variant contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Variant would also contribute to cumulative impacts on these transit routes on US-101. No feasible mitigation has been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Tower Variants would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Tower Variants' proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
The existing game day service and Tower Variants transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Tower Variants conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
The existing transit service and Tower Variants improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Tower Variants conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Tower Variants conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations. Implementation of mitigation measure MM TR-23.1 would reduce impacts to less than significant. Due to the uncertainty of this mitigation the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
SHADOW					
The Tower Variant would add shadows to Gilman Park during the hours between one hour after sunrise and one hour before sunset, with a new shadow load greater than 1.0 percent. This new shadow could have an adverse effect on the use of park. While Tower Variant A would not add shade after late morning or midday periods at any time of year, and the park would not be affected in afternoon periods of use, the shadow effect is conservatively considered to be a significant and unavoidable impact of Tower Variant C.					
Significance of Alternative Compared to Variant	<	<	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/NI	SU/NI	SU/NI	SU/NI
AIR QUALITY					
Operation of the Tower Variants would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out in the year 2029.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
NOISE					
Construction of the Tower Variants would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before construction activity on adjacent parcels is complete. Although the construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Construction activities associated with the Tower Variants would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-15 Comparison of the Significant and Unavoidable Impacts of Variant 3: Candlestick Point Tower to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Operation of the Tower Variants would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that would adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
CULTURAL RESOURCES					
The Tower Variants would result in a substantial adverse change in the significance of a historical resource. Implementation of mitigation measure MM CP-3b would reduce the impact, but not to a less-than-significant level. The impact would be significant and unavoidable.					
Significance of Alternative Compared to Variant	<	=	=	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/LTS	SU/SU

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina, or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
The Utilities Variant would result in construction-related transportation impacts in the Utilities Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the Utilities Variant vicinity. Mitigation measure MM TR-1 would reduce but not avoid construction-related transportation impacts during construction activities. Therefore, construction transportation impacts would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the Utilities Variant would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts. Although implementation of a Travel Demand Management Plan was assumed in developing Utilities Variant travel demand estimates, and would be essential to ensure that impacts at additional locations do not occur, traffic congestion caused by the Utilities Variant and the Utilities Variant's contribution to cumulative impacts would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
At the intersection of Tunnel/Blanken, the Utilities Variant would result in significant AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Utilities Variant contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Variant conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Utilities Variant contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Variant conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Utilities Variant contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Variant conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would result in significant Variant traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would contribute to significant cumulative traffic impacts at four freeway segments. No feasible mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would contribute to significant cumulative traffic impacts at 12 freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge All*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Utilities Variant would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Variant impacts and Variant contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion and contribute to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Implementation of mitigation measure MM TR-22.1 and MM TR-22.2 would reduce impacts to transit operations. However, since feasibility of MM TR-22.1 is uncertain, and since MM TR-22.2, without MM TR-22A, would reduce, but not completely avoid, impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy, Variant impacts and Variant contributions to cumulative impacts on the these lines would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Variant impacts and Variant contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Variant impacts and Variant contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The Utilities Variant would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, Utilities Variant impacts and Utilities Variant contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Variant impacts and Variant contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Variant would also contribute to cumulative impacts on these transit routes on US-101. No feasible mitigation has been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The Utilities Variant's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
For as many as 12 times a year 49ers games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
The existing game day service and Utilities Variant transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Utilities Variant conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
The existing transit service and Utilities Variant improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Variant conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Variant conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations. Implementation of mitigation measure MM TR-23.1 would reduce impacts to less than significant. Due to the uncertainty of this mitigation the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
AIR QUALITY					
Operation of the Utilities Variant would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SUSU	SU/SU	SU/SU
NOISE					
Construction of the Utilities Variant would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before construction activity on adjacent parcels is complete. Although the construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Construction activities associated with the Utilities Variant would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Operation of the Utilities Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that would adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
CULTURAL RESOURCES					
The Utilities Variant would result in a substantial adverse change in the significance of a historical resource. Implementation of mitigation measure MM CP-3b would reduce the impact, but not to a less-than-significant level. The impact would be significant and unavoidable.					
Significance of Alternative Compared to Variant	<	=	=	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/LTS	SU/SU

Table VI-16 Comparison of the Significant and Unavoidable Impacts of Variant 4: Utilities to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
TRANSPORTATION					
The 49ers/Shared Stadium Variant would result in construction-related transportation impacts in the 49ers/Shared Stadium Variant vicinity due to construction vehicle traffic and roadway construction and would contribute to cumulative construction impacts in the 49ers/Shared Stadium Variant vicinity. Mitigation measure MM TR-1 would reduce but not avoid construction-related transportation impacts during construction activities. Therefore, construction transportation impacts would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
Implementation of the 49ers/Shared Stadium Variant would cause an increase in traffic that would be substantial relative to the existing and proposed capacity of the street system, and result in significant and unavoidable impacts. Although implementation of a Travel Demand Management Plan was assumed in developing 49ers/Shared Stadium Variant travel demand estimates, and would be essential to ensure that impacts at additional locations do not occur, traffic congestion caused by the 49ers/Shared Stadium Variant and the 49ers/Shared Stadium Variant's contribution to cumulative impacts would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would result in significant impacts and would contribute to significant cumulative impacts at intersections in the Variant vicinity where no feasible traffic mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
At the intersection of Tunnel/Blanken, the 49ers/Shared Stadium Variant would result in significant AM peak hour traffic impacts, and contribute to cumulative PM peak hour traffic impacts, for which a feasible mitigation measure has been identified. The identified mitigation measure would improve traffic operations, but not to acceptable levels of service.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
49ers/Shared Stadium Variant contributions at some study area intersections that would operate at LOS E or LOS F under 2030 No Variant conditions were determined to be significant, and no feasible mitigation measures have been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
49ers/Shared Stadium Variant contributions at the intersections of Geneva/US-101 Southbound Ramps and Harney/US-101 Northbound Ramps, which would operate at LOS F under 2030 No Variant conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-6 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
49ers/Shared Stadium Variant contributions at the intersections of Bayshore/Geneva, which would operate at LOS F under 2030 No Variant conditions, were determined to be significant, and a mitigation measure has been identified to avoid this impact. However, implementation of mitigation measure MM TR-8 is uncertain, and this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would result in significant Variant traffic spillover impacts and contribute to cumulative traffic spillover impacts. The identified mitigation measures would reduce, but not avoid, traffic spillover impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would contribute to significant cumulative traffic impacts at four freeway segments. No feasible mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The 49ers/Shared Stadium Variant would result in significant impacts at four freeway on-ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would contribute to significant cumulative traffic impacts at 12 freeway ramp locations. No feasible traffic mitigation is available.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would result in significant impacts related to freeway diverge queue storage at the Harney/US-101 Northbound Off-ramp. Mitigation measure MM TR-6 has been identified to avoid this impact, but its implementation is uncertain. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would contribute to significant cumulative traffic impacts related to freeway diverge queue storage at some off-ramp locations. Mitigation measure MM TR-6 has been identified to avoid this impact at the US-101 Northbound off-ramp to Harney Way, and US-101 Southbound Off-ramp to Harney Way/Geneva Avenue. However, implementation is uncertain. For the other ramps, no feasible mitigations have been identified. Therefore, this impact would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion and contribute to cumulative conditions at intersections along San Bruno Avenue, which would increase travel times and impact operations of the 9-San Bruno. Implementation of mitigation measures MM TR-21.1 and MM TR-21.2 could reduce impacts to transit operations. However, since feasibility of MM TR-21.1 is uncertain, and since MM TR-21.2, without MM TR-21.1, would reduce, but not completely avoid, impacts on the 9-San Bruno, Variant impacts and Variant contributions to cumulative impacts on the 9-San Bruno would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion and contribute to cumulative conditions at intersections along Palou Avenue, which would increase travel times and impact operations of the 23-Monterey, 24-Divisadero, and the 44-O'Shaughnessy. Implementation of mitigation measure MM TR-22.1 and MM TR-22.2 would reduce impacts to transit operations. However, since feasibility of MM TR-22.1 is uncertain, and since MM TR-22.2, without MM TR-22A, would reduce, but not completely avoid, impacts on the 23-Monterey, 24-Divisadero, and 44-O'Shaughnessy, Variant impacts and Variant contributions to cumulative impacts on the these lines would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The 49ers/Shared Stadium Variant would increase congestion at intersections along Gilman Avenue and Paul Avenue, which would increase travel times and would impact operations of the 29-Sunset. Implementation of mitigation measures MM TR-23.1 and MM TR-23.2 would reduce impacts to transit operations. However, since feasibility of MM TR-23.1 is uncertain, and since MM TR-23.2, without MM TR-23.1, would reduce, but not completely avoid, impacts on the 29-Sunset, Variant impacts and Variant contributions to cumulative impacts on the 29-Sunset would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion at intersections along Evans Avenue, which would increase travel times and impact operations of the 48-Quintara-24th Street. Implementation of mitigation measures MM TR-24.1 and MM TR-24.2 would reduce impacts to transit operations. However, since feasibility of MM TR-24.1 is uncertain, and since MM TR-24.2, without MM TR-24.1, would reduce, but not completely avoid, impacts on the 48-Quintara-24th Street, Variant impacts and Variant contributions to cumulative impacts on the 48-Quintara-24th Street would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion at intersections in the study area, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the 54-Felton. Implementation of mitigation measure MM TR-25 would reduce, but not avoid impacts.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion at intersections along Third Street, and make a considerable contribution to cumulative impacts that would increase travel times and impact operations of the T-Third. Implementation of mitigation measures MM TR-26.1 and MM TR-26.2 would reduce impacts to transit operations. However, since feasibility of MM TR-26.1 is uncertain, and since MM TR-26.2, without MM TR-26.1, would reduce, but not completely avoid, impacts on the T-Third, 49ers/Shared Stadium Variant impacts and 49ers/Shared Stadium Variant contributions to cumulative impacts on the T-Third would remain significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion at the intersection of Geneva Avenue and Bayshore Boulevard. This would increase travel times and impact operations of the 28L-19th Avenue/Geneva Limited. Implementation of mitigation measures MM TR-27.1 and MM TR-27.2 would reduce impacts to transit operations. However, since feasibility of MM TR-27.1 is uncertain, and since MM TR-27.2, without MM TR-27.1, would reduce, but not completely avoid, impacts on the 28L-19th Avenue/Geneva Limited, Variant impacts and Variant contributions to cumulative impacts on the 28L-19th Avenue/Geneva Limited would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The 49ers/Shared Stadium Variant would increase congestion on US-101 mainline and ramps, which would increase travel times and impact operations of the 9X, 9AX, 9BX-Bayshore Expresses, and 14X-Mission Express. The Variant would also contribute to cumulative impacts on these transit routes on US-101. No feasible mitigation has been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant would increase congestion and contribute to cumulative congestion on US-101 and on Bayshore Boulevard, which would increase travel times and adversely affect operations of SamTrans bus lines on these facilities. No feasible mitigation has been identified.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU
The 49ers/Shared Stadium Variant's proposed transit preferential treatments and significant increases in traffic volumes on Palou Avenue would result in impacts on bicycle travel on Bicycle Routes #70 and #170 between Griffith Street and Third Street. The effectiveness of mitigation is uncertain. Therefore, the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/SU	SU/SU
For as many as 24 times a year 49ers/Raiders games at the proposed stadium would result in significant impacts on study area roadways and intersections. Implementation of mitigation measure MM TR-38 would lessen game-day impacts; however, traffic impacts would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
The existing game day service and 49ers/Shared Stadium Variant transit improvements would not be adequate to accommodate projected transit demand. Implementation of mitigation measure MM TR-39 would reduce game-day impacts on transit capacity; however, traffic impacts on transit operations would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening secondary events at the stadium would result in increased congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under 49ers/Shared Stadium Variant conditions without a secondary event, and result in significant impacts at nine additional intersections and one additional freeway off-ramp. Implementation of mitigation measure MM TR-46 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
The existing transit service and 49ers/Shared Stadium Variant improvements would not be adequate to accommodate projected transit demand during secondary events with attendance of 37,500 spectators. In addition, transit lines serving the area would experience additional delays due to traffic generated by the secondary event.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
Weekday evening events at the arena would exacerbate congestion at intersections, freeway mainline, and freeway ramps already operating at unacceptable LOS under Variant conditions without an arena event, and result in significant traffic impacts at Harney Way and Jamestown Avenue, which was operating acceptably under Variant conditions without an arena event. Mitigation measure MM TR-51 would reduce but not avoid impacts.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
Sell-out weekday evening events at the arena would be accommodated within the existing and proposed transit service. However, traffic congestion would impact transit operations. Implementation of mitigation measure MM TR-23.1 would reduce impacts to less than significant. Due to the uncertainty of this mitigation the impact would remain significant.					
Significance of Alternative Compared to Variant	<	=	<	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/SU
AIR QUALITY					
Operation of the 49ers/Shared Stadium Variant would violate BAAQMD CEQA significance thresholds for mass criteria pollutant emissions from mobile and area sources and contribute substantially to an existing or projected air quality violation at full build-out.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
NOISE					
Construction of the 49ers/Shared Stadium Variant would create excessive groundborne vibration levels in existing residential neighborhoods adjacent to the Project site and at proposed on-site residential uses should the latter be occupied before construction activity on adjacent parcels is complete. Although the construction vibration impacts would be temporary, would not occur during recognized sleep hours, and would be consistent with the requirements for construction activities that exist in Sections 2907 and 2908 of the *Municipal Code*, vibration levels would still be significant.					
Significance of Alternative Compared to Variant	=	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/SU	SU/SU	SU/SU	SU/SU	SU/SU

Table VI-17 Comparison of the Significant and Unavoidable Impacts of Variant 5: 49ers/Raiders Shared Stadium to Each of the Alternatives

	Alternative 1 No Project[a]	*Alternative 2 No Bridge Alt*[b]	*Alternative 3 49ers at Candlestick*[c]	*Alternative 4 Lesser Build with Historic Preservation*[d]	*Alternative 5 No Park Agreement*[e]
Construction activities associated with the 49ers/Shared Stadium Variant would result in a substantial temporary or periodic increase in ambient noise levels.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Operation of the 49ers/Raiders Shared Stadium Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes.					
Significance of Alternative Compared to Variant	<	=	=	=	=
Level of Significance after Mitigation (Variant/Alternative)	SU/LTS	SU/SU	SU/SU	SU/SU	SU/SU
Noise during football games and concerts at the proposed stadium would result in temporary increases in ambient noise levels that would adversely affect surrounding residents for the duration of a game or concert.					
Significance of Alternative Compared to Variant	<	=	<	<	<
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/NI	SU/NI	SU/NI
CULTURAL RESOURCES					
The 49ers/Raiders Shared Stadium Variant would result in a substantial adverse change in the significance of a historical resource. Implementation of mitigation measure MM CP-3b would reduce the impact, but not to a less-than-significant level. The impact would be significant and unavoidable.					
Significance of Alternative Compared to Variant	<	=	=	<	=
Level of Significance after Mitigation (Variant/Alternative)	SU/NI	SU/SU	SU/SU	SU/LTS	SU/SU

< Alternative does lessen the severity of the impact
> Alternative increases the severity of the impact
= Alternative impact is similar to the Project impact
NI = No Impact
LTS = Less-Than-Significant impact
SU = Significant and Unavoidable Impact

a. No Project
b. CP-HPS Phase II Development Plan, HPS Phase II Stadium, State Parks Agreement, and without the Yosemite Slough Bridge
c. Reduced CP-HPS Phase II Development, San Francisco 49ers Stay at Existing Candlestick Park Stadium, with Limited State Parks Agreement, and Yosemite Slough Bridge Serving Only Transit, Bicycles, and Pedestrians
d. Reduced CP-HPS Phase II Development; Historic Preservation; State Parks Agreement; No HPS Phase II Stadium, Marina or Yosemite Slough Bridge
e. Reduced CP-HPS Phase II Development, No HPS Phase II Stadium, No State Parks Agreement, and without the Yosemite Slough Bridge

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CHAPTER VIII **Acronyms/Abbreviations and Glossary**

VIII.A ACRONYMS/ABBREVIATIONS

Acronym/ Abbreviation	*Definition*
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
AB 32	California Global Warming Solutions Act of 2006
ABAG	Association of Bay Area Governments
ACB	Articulated Concrete Block
ACBM	Asbestos Containing Building Materials
ACORN	Association of Community Organizations for Reform Now
ADA	American Disabilities Act
ADMP	Asbestos Dust Mitigation Plan
ADRP	Archaeological Data Recovery Plan
AEP	Association of Environmental Professionals
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Agency	San Francisco Redevelopment Agency
Agency Commission	San Francisco Redevelopment Agency Commission
AGO	California Attorney General's Office
ALS	Advanced Life Support
AMI	Area Median Income
AMP	Archaeological Monitoring Program
ANSI	American National Standards Institute
AOC	Administrative Order of Consent
ARB	California Air Resources Board
ARDTP	Agency for Toxic Substances and Disease Registry
ARIC	Area Requiring Institutional Controls
AST	Above-Ground Storage Tank
AT&T Park	San Francisco Giants Ballpark
ATCM	Asbestos Airborne Toxic Control Measure
ATP	Archaeological Testing Plan
ATSDR	Agency for Toxic Substances and Disease Registry
AWSC	All-Way Stop Controlled
AWSS	Auxiliary Water Supply System
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Basin Plan	San Francisco Bay Basin Water Quality Control Plan
BASMAA	Bay Area Stormwater Management Agencies Association
BAT	Best Available Technology Economically Achievable
BAU	Business as Usual

Acronym/ Abbreviation	*Definition*
Bay	San Francisco Bay
Bay Area	San Francisco Bay Area
Bay Plan	San Francisco Bay Plan
Bay Trail	San Francisco Bay Trail
Bay Trail Plan	*San Francisco Bay Trail Plan*
BayCAMP	Bayview Community Air Monitoring Project
BCDC	San Francisco Bay Conservation and Development Commission
BCT	Best Conventional Pollutant Control Technology
BERA	Baseline Ecological Risk Assessment
BFE	Base Flood Elevation
BIT	Bayview Industrial Triangle
BLIP	Branch Library Improvement Program
BLS	Basic Life Support
BMPs	Best Management Practices
Board of Supervisors	San Francisco Board of Supervisors
BOE	Bureau of Engineering
Boundaries Analysis	San Francisco Police Department District Station Boundaries Analysis
BRAC	Base Realignment and Closure
Brisbane Baylands North	Brisbane Baylands Future Phase Area
Brisbane Baylands South	Brisbane Baylands Phase I Specific Plan Area
BRT	Bus Rapid Transit
BTI	Bayview Transportation Improvements
BTIP	Bayview Transportation Improvements Project
BVHP	Bayview Hunters Point
BVHP Area Plan	Bayview Hunters Point Area Plan
BVHP Redevelopment Plan	Bayview Hunters Point Redevelopment Plan
BWWF	Bayside Wet Weather Facilities
C&D	Construction and Demolition
C&R	Comment and Response
C-1 Baylands	Commercial Mixed-Use Zoning District
C_2F_6	PFC: Hexafluoroethane
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAC	Citizens Advisory Committee
CAFE	Corporate Average Fuel Economy
Cal/EPA	California Environmental Protection Agency
Cal/OSHA	California Department of Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAP	Climate Action Plan (as used in the Greenhouse Gas Emissions section)
CAP	Corrective Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARE	Community Air Risk Evaluation
CAT	Climate Action Team
CBC	California Building Code
CCAR	California Climate Action Registry

Acronym/ Abbreviation	*Definition*
CCBA	Core Community Benefits Agreement
CCCC	California Climate Change Center
CCR	California Code of Regulations
CCSF	City and County of San Francisco
CCTA	Contra Costa Transportation Authority
CDC	Centers for Disease Control
CDFG	California Department of Fish and Game
CDPH	California Department of Public Health
CDPR	California Department of Parks and Recreation
CEC	California Energy Commission
CEG	Certified Engineering Geologist
Central Bay	San Francisco Bay Central
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Cleanup and Liability Act
CESA	California Endangered Species Act of 1984
CEUS	California Commercial End-Use Survey
CF_4	PFC: Tetrafluoromethane
CFCs	Chlorofluorocarbons
CFD	Community Facilities District
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	Methane
CHP	California Highway Patrol
CIE	Cultural/Institutional/Educational
City	City and County of San Francisco
CIWMB	California Integrated Waste Management Board
CMP	Congestion Management Program
CMTP	Construction Management Traffic Plan
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COG	Council of Governments
Concept Plan	Bayview Hunters Point Community Revitalization Concept Plan
Construction General Permit	NPDES General Permit for Storm Water Discharges Associated with Construction Activity
Corps	United States Army Corps of Engineers
CP	Candlestick Point
CP-HPS Phase II	Candlestick Point–Hunters Point Shipyard Phase II
CPSRA	Candlestick Point State Recreation Area
CPSRA General Plan	Candlestick Point State Recreation Area General Plan
CPUC	California Public Utilities Commission
CPX	Candlestick Point Downtown Express

Acronym/ Abbreviation	*Definition*
CRHR	California Register of Historic Resources
CSLC	California State Lands Commission
CSMP	Construction Site Monitoring Program
CSO	Combined Sewer Overflow
CTC	California Transportation Commission
CTMP	Construction Transportation Management Plan
CTTP 2000	Census 2000 Transportation Planning Package
CWA	Clean Water Act of 1977
CY	Cubic Yards
D4D	Design for Development
dBA	A-weighted decibel scale
DBH	Diameter at Breast Height
DBI	Department of Building Inspection
DCP	Dust Control Plan
DDA	Disposition and Development Agreement
DDC	Deep Dynamic Compaction
DDT	Dichlro-diphenyl-trichloroethane
DEIS	Draft Environmental Impact Statement
Demand Report	2004 San Francisco Retail Water Demands and Conservation Potential Report
DHS	California Department of Health Services
DMMO	Dredged Material Management Office
DOD	Department of Defense
DOE	United States Department of Energy
DOT	United States Department of Transportation
DPH	Department of Public Health
DPM	Diesel Particulate Matter
DPR	California Department of Parks and Recreation
DPS	Distinct Population Segment
DPW	Department of Public Works
DTSC	California Department of Toxic Substances Control
Dust Ordinance	Construction Dust Control Ordinance
DWR	Department of Water Resources
EAM	Early Action Measure
eb	East Bound
EC	Elemental carbon
EE	Environmental Evaluation
EFH	Essential Fish Habitat
EHS	Electromagnetic hypersensitivity
EHSP	Environmental Health and Safety Plan
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act of 2007
EMFAC	Emission Factor Model
EMS	Emergency Medical Services
EMS	Environmental Management System (as used in the Utilities section)

Acronym/ Abbreviation	*Definition*
ENA	Exclusive Negotiations Agreement
ENVIRON	ENVIRON International Corporation
EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessment
ERM	Effects Range Median
ERO	Environmental Review Officer
ESA	Environmental Site Assessment (as used in the Hazards and Hazardous Materials section)
ESA	Endangered Species Act (as used in the Biological Resources section)
ESCP	Erosion and Sediment Control Plan
ESUs	Evolutionary Significant Units
ETCA	Early Transfer Cooperation Agreement
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	Facultative
FACW	Facultative Wetland
FARR	Final Archaeological Resources Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act of 1973
FFA	Federal Facilities Agreement
FHWA	Federal Highway Administration
Findings	Findings of Fact
FIRM	Flood Insurance Rate Map
FMP	Fisheries Management Plan
FOSET	Finding of Suitability for Early Transfer
FOSL	Finding of Suitability to Lease
FOST	Finding of Suitability Transfer
FS	Feasibility Study
FTA	Federal Transit Administration
FTE	Full-time Equivalent
g	Gravity
GCMs	General Circulation Models
GE	California Registered Geotechnical Engineer
General Plan	San Francisco General Plan
Geomatrix	Geomatrix Consultants, Inc.
GGBHTD	Golden Gate Bridge, Highway, and Transportation District
GGNRA	Golden Gate National Recreation Area
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GMP	Gas Monitoring Probe
GP Guidelines	General Plan Guidelines 2003
GPM	Gallons Per Minute
GPR	Green Point Rated
GPRC	Geotechnical Peer Review Committee
GRACE	Gravity Recovery and Climate Experiment
gsf	Gross Square Feet

Acronym/ Abbreviation	*Definition*
GWP	Global Warming Potential
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HASP	Health and Safety Plan
HBO	Home Based Other Trip
HBS	Home Based Shopping
HBW	Home Based Work
HCD	Housing and Community Development
HCM	Highway Capacity Manual
HCM	Highway Capacity Manual
HFCs	Hydrofluorocarbons
HHRA	Human Health Risk Assessment
HHWP	Hetch Hetchy Water and Power
HI	Hazard Index
HMBP	Hazardous Materials Business Plan
HMFRA	Housing and Fair Market Development Metro Fair Market Rent Area
Housing Program	Citywide Tax Increment Housing Program
Housing Variant	Variant 2: No Stadium – Housing Variant
HOV	High Occupancy Vehicle
HPRP	Hunters Point Redevelopment Plan
HPS	Hunters Point Shipyard
HPS Phase II	Hunters Point Shipyard Phase II
HPS Redevelopment Plan	Hunters Point Shipyard Redevelopment Plan
HPX	Hunters Point Shipyard Downtown Express
HR 2764	The Consolidated Appropriations Act of 2008
HRA	Historical Radiological Assessment
HRE	Historic Resource Evaluation
HSRA	High-Speed Rail Authority
HTL	High Tide Level
HUD	US Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
I-280	Interstate 280
IB	India Basin
IBC	International Building Code
IBIP	India Basin Industrial Park
ICBO	International Conference of Building Officials
ICC	International Code Council
ICs	Institutional Controls
IEPR	Integrated Energy Policy Report
Industrial General Permit	NPDES General Industrial Permit for Discharges of Storm Water Associated with Industrial Activities
Interim CIP	Wastewater Enterprise Interim Capital Improvement Program
IPCC	Intergovernmental Panel on Climate Change
IR Sites	Installation Restoration Sites
IRP	Installation Restoration Program

Acronym/ Abbreviation	*Definition*
IS	Initial Study
ITE	Institute of Transportation Engineers
ITL	Interim Target Level
JARPA	Joint Aquatic Resources Permit Applications
JPB	The Peninsula Corridor Joint Powers Board
K	Kindergarten (as used in the Public Services section)
KJ	Franciscan Complex
Kyoto Protocol	United Nations' Framework Convention on Climate Change Agreement
lbs	pounds
LCA	Life Cycle Assessment
LCFS	Low Carbon Fuel Standard
LEED®	Leadership in Energy and Environmental Design
Lennar Urban	Lennar/Bayview Hunters Point Limited Liability Corporation
L_{eq}	Average Noise Level
LID	Low Impact Development
LIFOC	Lease in Furtherance of Conveyance
L_{max}	Highest Peak Noise
L_n	Statistical Sound Level
LOMR-F	Letter of Map Revision Based on Fill
LOS	Level of Service
Lower Bay	San Francisco Bay Lower
LRT	Light Rail Transit
LRV	Light-Rail Vehicle
LRV	Light Rail Vehicle
LTMS	Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region
LTS	Less-Than-Significant Impact
LTS/M	Less-Than-Significant Impact with Mitigation
LUCRD	Land Use Control Remedial Designs
LUPs	Linear Underground/Overhead Projects
LWCF	Land and Water Conservation Fund
LWCFA	Land and Water Conservation Fund Act of 1965
M	Moment Magnitude (as used in the Geology and Soils section)
M	Manufacturing
M-1	Light Industrial District
M-2	Heavy Industrial District
MBRs	Membrane Bioreactors
MBTA	Migratory Bird Treaty Act
MBtu	Million British Thermal Units
MC	Motor Coach
MEA	Major Environmental Analysis
MED	Medical and Health Services
MEI	Maximally Exposed Individual
MEP	Maximum Extent Practicable (as used in the Hydrology and Water Quality section)

Acronym/ Abbreviation	*Definition*
MEP	Maximum Extent Possible (as used in the Hydrology and Water Quality section)
MGD	Million Gallons per Day
MHW	Mean High Water
MID	Modesto Irrigation District
MIP	Management and Information Professional Services
Mitigation Monitoring Plan	Wetland and Jurisdictional Waters Mitigation Monitoring Plan
MLD	Most Likely Descendant
MLLW	Mean Lower Low Water
MM	Mitigation Measure
MMI	Modified Mercalli Intensity
MMPA	Marine Mammal Protection Act
MMRP	Mitigation Monitoring and Report Program
$MMTCO_2E$	Million Metric Tons of CO_2-Equivalent
MOA	Memorandum of Agreement
MPH	Miles per hour
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MSA	Magnuson-Stevens Act
MT	Metric Tonnes
MTC	Metropolitan Transportation Commission
MTS	Metropolitan Transportation System
MU	Mixed-Use
Muni	San Francisco Municipal Railway
Municipal Stormwater General Permit	Phase II NPDES General Permit for the Discharge of Storm Water from Small MS4s
N_2O	Nitrous Oxide
NAHC	Native American Heritage Commission
NALs	Technology-Based Numeric Action Levels
NASA	National Aeronautics and Space Administration
NAT	No Action Taken
NAVD88	North American Vertical Datum of 1988
Navy	United States Navy
nb	North Bound
NC	Neighborhood Commercial
NC-1	Neighborhood Commercial Cluster
NC-2	Small-Scale Neighborhood Commercial
NCD-IB	Neighborhood Commercial District, India Basin
NCP	National Contingency Plan
NEHRP	National Earthquake Hazards Reduction Program
NELs	Technology-Based Numeric Effluent Limitations
NEP	New Expenditure Plan
NEPA	National Environmental Policy Act
NFA	No Further Action
NFIP	National Flood Insurance Program

Acronym/ Abbreviation	*Definition*
NFL	National Football League
NGVD29	National Geodetic Vertical Datum
NHB	Non-home Based
NHPA	National Historic Preservation Act of 1966
NHTSA	National Highway Traffic Safety Administration
NI	No Impact
NMFS	National Marine Fisheries Services
NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPRA	National Parks and Recreation Association
NPS	National Park Service
NPSs	Nonpoint Sources (as used in the Hydrology and Water Quality section)
NPWWF	North Point Wet Weather Facility
NRC	National Resource Council
NRDL	Naval Radiological Defense Laboratory
NRHP	National Register of Historic Places
NSC	No Significant Contribution
NSMCSD	North San Mateo County Sanitation District
NTP	Neighborhood Transportation Plan
NURP	Nationwide Urban Runoff Program
NWIC	California Archaeological Site Survey Northwest Information Center
O&G	Oil and Grease
O_3	Ozone
OAL	Office of Administrative Law
OBL	Obligate
°F	degrees Fahrenheit
OHW	Ordinary High Water
OPA	Owner Participation Agreement
OPR	California Office of Planning and Research
OS	Open Space
OSHA	Occupational Safety and Health Agency
P	Public
PA	Programmatic Agreement
PA	Public Address System (as used in the Noise and Vibration section)
PA&ED	Project Approval and Environmental Document
PA/SI	Preliminary Assessment and Site Identification
PAC	Bayview Hunters Point Project Area Committee
PAHs	Polycyclic Aromatic Hydrocarbons
Pathogens	Bacteria and Viruses
Pb	Lead

Acronym/ Abbreviation	*Definition*
pc/h	Passenger cars per hour
pc/mi/ln	Passengers cars per mile per lane
PCBs	Polychlorinated Biphenyls
PCC	Portland Concrete Cement
PCEs	Primary Constituent Elements
PCOs	Parking Control Officers
PCWQCA	Porter-Cologne Water Quality Control Act
PDF	Project Design Feature
PDR	Production, Distribution, and Repair
PDT	Pacific Daylight Time
PE	Professional Engineer
PEIR	Program Environmental Impact Report
Peninsula	San Francisco Bay Area Peninsula
PFCs	Perfluorocarbons
PG&E	Pacific Gas and Electric
Phase I ESA	Phase I Environmental Site Assessment
PI	Project Impact
Pier 80 Outfall	Southeast Pollution Control Outfall
Planning Code	San Francisco Planning Code
Planning Commission	San Francisco Planning Commission
Planning Department	San Francisco Planning Department
PM	Particle Matter
PM_{10}	Respirable Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
Port	Port of San Francisco
ppm	Parts per Million
PPRF	Pulse Plasma Rock Fragmentation
PRC	Public Resources Code
PRDs	Permit Registration Documents
PRMMP	Paleontological Resources Monitoring and Mitigation Program
Project	Candlestick Point – Hunters Point Shipyard Phase II Development Plan Project
PSSG	Public Safety Strategies Group
PST	Pacific Standard Time
PV	Photovoltaic
Qaf	Artificial Fill
Qc	Colma Formation
Qm	Bay Mud Deposits
QMS	Quality Management System
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
Qsr	Slope Debris and Revise Fill
Qu	Undifferentiated Sedimentary Deposits
R Value	Rainfall Erosivity Value
R&D	Research and Development
R&D Variant	Variant 1: No Stadium – Additional Research and Development Variant

Acronym/ Abbreviation	*Definition*
RAP	Rammed Aggregate Piers
RBCA	Risk Based Corrective Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
REAP	Rain Event Action Plan
REB	Resource Efficient Building
RECs	Recognized Environmental Conditions
Recycled Water General Permit	General Waste Discharge Requirements for Landscaping Irrigation Uses of Municipal Recycled Water
RET	Retail
RFS	Renewable Fuel Standard
RFS	Renewable Fuel Standard
RH-1	Residential House One-Family District
RH-1D	Residential House Character District
RH-2	Residential House Two-Family District
RHNA	Regional Housing Needs Assessment
RHNP	Regional Housing Needs Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIC	Rapid Impact Compaction
RM-1	Residential, Mixed District
RM-2	Residential, Mixed Moderate Density District
RMP	Risk Management Plan
ROD	Record of Decision
ROG	Reactive Organic Gas
ROWD	Report of Waste Discharge
RPD	San Francisco Recreation and Park Department
RPP	Residential Permit Parking
RPS	Renewables Portfolio Standard
RTAC	Regional Targets Advisory Committee
RTPs	Regional Transportation Plans
RUSLE	Revised Universal Soil Loss Equation
RV	Recreational Vehicle
RWMP	Recycled Water Master Plan
RWQCB	Regional Water Quality Control Board
RWS	Regional Water System
RWSAP	Retail Water Shortage Allocation Plan
SACOG	Sacramento Area Council of Governments
SamTrans	San Mateo County Transit Districts
SAP	Special Area Plan
SB	Senate Bill
sb	South Bound
SC	Specific Conductance
SC	Standard Condition (as used in the Climate Change section)
SC/PI	Significant Contribution/Project Impact
SCBA	Self-Contained Breathing Apparatus

Acronym/ Abbreviation	*Definition*
SCC	California State Coastal Conservancy
SCP	Stormwater Control Plan
SDMP	Stormwater Drainage Master Plan
Seaport Plan	San Francisco Bay Area Seaport Plan
SF_6	Sulfur Hexafluoride
SFAB	San Francisco Bay Area Air Basin
SFBC	San Francisco Building Code
SFCAP	San Francisco Climate Action Plan
SFCD	San Francisco City Datum
SF-CHAMP	San Francisco County's travel demand model
SFCTA	San Francisco County Transportation Authority
SFDPH	San Francisco Department of Public Health
SFDPW	San Francisco Department of Public Works
SFEI	San Francisco Estuary Institute
SFFD	San Francisco Fire Department
SFGSP	San Francisco Groundwater Supply Project
SFHA	San Francisco Housing Authority
SFHA	Special Flood Hazard Area (as used in the Hydrology and Water Quality section)
SFMTA	The San Francisco Municipal Transportation Agency
SFO	San Francisco International Airport
SFPD	San Francisco Police Department
SFPL	San Francisco Public Library
SFPUC	San Francisco Public Utilities Commission
SFRPD	San Francisco Recreation and Park Department
SFRWQCB	San Francisco Bay Regional Water Quality Control Board
SFUSD	San Francisco Unified School District
SGMP	Soil and Groundwater Management Plan
SHPO	State Historic Preservation Officer
SI	Site Identification
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SLERA	Screening-Level Ecological Risk Assessment
SO_2	Sulfur Dioxide
SoMa	South of Market
SP	Service Population
SPP	Spill Prevention Plans
SPT	Standard Penetration Test
SRA	State Recreation Area
SRRE	Source Reduction and Recycling Element
SSSC	Side-Street Stop Controlled
Stormwater Design Guidelines	Draft San Francisco Stormwater Design Guidelines
SU	Significant and Unavoidable Impact
SUD	Special Use District
SVE	Soil Vapor Extraction System

Acronym/ Abbreviation	*Definition*
SVOCs	Semi-Volatile Organic Compounds
SVP	Society for Vertebrate Paleontology
SWIS	Solid Waste Information
SWMP	Site Waste Management Plan (as used in the Utilities section)
SWMP	Stormwater Management Plan (as used in the Hydrology and Water Quality section)
SWPCP	Southeast Water Pollution Control Plant
SWPPP	Storm Water Pollution Prevention Plans
SWRCB	State Regional Water Quality Control Board
TAC	Toxic Air Contaminants
TAR	Third Assessment Report
TAZ	Traffic Analysis Zones
TBD	To Be Determined
TC	Trolley Coach
TCRA	Time Critical Removal Action
TDM	Transportation Demand Management
TDM Plan	Transportation Demand Management Plan
TDS	Total Dissolved Solids
TEP	Transit Effectiveness Project
TEPHd	Total Extractable Petroleum Hydrocarbons as Diesel
Tg	Teragram
TMDL	Total Maximum Daily Load
TMP	Transportation Management Plan
TNM	Traffic Noise Model
TOC	Total Organic Carbon
Tower Variants	Candlestick Point Tower Variants
TPH	Total Petroleum Hydrocarbons
TPS	Transit Preferential Street
TPS	Transit Preferential Street
Triple A	Triple A Machine Shop
TSDs	Treatment, Storage, and Disposal Facilities
TSS	Total Suspended Solids
UCSF	University of California, San Francisco
UPC	Universal Paragon Corporation
URBEMIS	Urban Emissions Model
US	United States
US DOT	United States Department of Transportation
USEPA Levels	Information of Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety
US-101	United States Highway 101
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGBC	United States Green Building Council
USGS	United State Geological Survey

Acronym/ Abbreviation	*Definition*
UST	Underground Storage Tank
UWMP	Urban Water Management Plan
v/c	Volume/Capacity
VCA	Voluntary Cleanup Agreement
VdB	Vibration Decibels
VDECS	Verified Diesel Emission Control Strategies
VIS	Visitor Lodging
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds
VOR	Vehicle Occupancy Rate
VTA	Santa Clara Valley Transportation Authority
V-Zones	Coastal High Hazard Areas
Waterfront Plan	Port of San Francisco Waterfront Land Use Plan
wb	West Bound
WDR	Waste Discharge Requirement
WEPA	Worker Environmental Awareness Program
WETA	San Francisco Bay Area Water Emergency Transportation Agency
WETA	Water Emergency Transit Authority
WHO	World Health Organization
WSA	Water Supply Assessment
WSAP	Water Shortage Allocation Plan
WSAS	Water Supply Availability Study
WSIP	Water Supply Improvement Program
WTP	Water Treatment Plant
WWII	World War II
XII	Total Destruction on the Modified Mercalli Intensity Scale
ZVI	Zero-Valent Iron

VIII.B GLOSSARY

Alluvial: A loose deposit of gravel, sand, mud, etc., formed by flowing water.

Alquist-Priolo Earthquake Fault Zone: In 1972 the State of California began delineating special studies zones (called Earthquake Fault Zones since January 1994) around active and potentially active faults in the state. The zones are revised periodically, and extend 200 to 500 feet on either side of identified fault traces. No structures for human occupancy may be built across an identified active fault trace. An area of 50 feet on either side of an active fault trace is assumed to be underlain by the fault, unless proven otherwise. Proposed construction in the Earthquake Fault Zone is permitted only following the completion of a fault location report prepared by a California-registered professional Geologist

Ambient: The lowest sound level repeating itself during a minimum 10-minute period as measured with a type 1, precision sound level meter, set on slow response and A-weighting.

Analytical Practical Quantification Limit: The lowest level of certainty that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

Ballast Water: Water used to weight a ship to the water's surface, preventing toppling during heavy winds.

Basement Rock: Refers to the thick foundation of ancient and oldest metamorphic and igneous rock that forms the crust of continents. Sedimentary rocks are laid down on top of basement rock after the continents form. Some basement rock is visible from the surface, such as at the bottom of the Grand Canyon.

Break-bulk Cargo: A shipping term for any loose material that must be loaded individually, not in shipping containers or in bulk as with oil or grain.

Btu: Approximately the amount of energy needed to heat one pound of water one degree Fahrenheit.

Bulkhead Site: The area between the waterfront roadway and the pier or water. Many bulkhead sites house structures that provide entrances to the piers.

Cancer risk: Calculated approximation of the probability of an individual developing cancer as a result of exposure to a cumulative dose of a potential carcinogen based on estimated or measured concentrations in soil, groundwater, or air and a potency factor specific to that carcinogen.

Carbon Monoxide: A colorless, odorless gas produced by the incomplete combustion of fuels.

Carcinogen: Cancer-causing.

Characteristic Earthquake: Characteristic earthquakes are repeat earthquakes that have the same faulting mechanism, magnitude, rupture length, location, and, in some cases, the same epicenter and direction of rupture propagation as earlier shocks. As used in this report, the moment magnitude (M) of the "characteristic earthquake" indicates the scale of the seismic event considered representative of a particular fault segment, based on seismologic observations and statistical analysis of the probability that a larger earthquake would not be generated during a given time frame (often 50 or 100 years). In the Bay Area, the characteristic earthquake for the Peninsula segment of the San Andreas Fault has a moment magnitude (M) of 7.3; the Northern and Southern segments of the Hayward fault, an M of 6.9; and the Calaveras fault, M 6.2. The term "characteristic earthquake" replaces the term "maximum credible earthquake" as a more reliable descriptor of future fault activity (Working Group on California Earthquake Probabilities, *Earthquake Probabilities in the San Francisco Bay Region: 2002–2031*, USGS Open-File Report 2003-214, 2003).

Chronic exposure: Repeated doses of or exposure to a substance over a relatively prolonged period of time (i.e., many years versus a few days).

Colluvial: A loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope.

Combined Sewer Overflow (CSO): An overflow is a pipe that discharges flows that exceed the capacity of the combined sewer system during very heavy rain. Such discharges receive primary (flow-through) treatment in underground storage/transport boxes. Overflow events are relatively rare in San Francisco.

Densification: Increasing the density of soil.

Detention: Slowing down, temporary storing, and releasing stormwater runoff at a controlled rate.

Dose: The amount of a chemical substance to which an organism is exposed.

Draft Final 2005 Industrial General Permit: Contains parameter benchmark concentrations for constituents commonly found in stormwater runoff from industrial facilities (indicator parameters), which are derived from USEPA's Multi-Sector General Permit.

Dual plumbing: A system of separated water and wastewater lines.

Effects Range Median (ERM): The concentration above which effects are frequently or always observed among most species of biota.

Embayment: A small bay or any small semi-enclosed coastal water body whose opening to a large body of water is restricted.

ENERGY STAR: A joint program of the US Environmental Protection Agency and the US Department of Energy that sets energy efficiency guidelines for appliances and homes.

Estuarine: The part of the mouth or lower course of a river in which the river's current meets the sea's tide.

Exposure pathway: The course a chemical or pollutant takes from the source to the organism exposed. A complete exposure pathway consists of four elements: chemical sources, migration routes (i.e., transport in the environment), an exposure point for contact (i.e., soil, air, or, water); and exposure routes. An exposure pathway is not complete unless all four elements are present.

Exposure route: The way a chemical or pollutant enters the organism after contact. Four exposure routes are recognized in risk evaluation methods: ingestion, inhalation, dermal (skin and eye), and injection.

Extremely hazardous substance: In the context of *Public Resources Code* Section 21151.4 pertaining to hazardous materials emissions near schools, this refers to a material included on lists compiled pursuant to Section 25532 of the *California Health and Safety Code*, which incorporates regulated toxic and flammable substances under Section 112(r) of the federal *Clean Air Act* Table 3 of Section 112(r) lists those regulated substances pursuant to Section 25532(g)(2) of *California Health and Safety Code*. Threshold quantities for listed toxic and flammable substances are specified in the tables.

Fault Creep: Movement along a fault that does not entail earthquake activity.

Fine Particulate Matter: Extremely small, suspended particles or droplets 2.5 microns or smaller in diameter.

Fixed Source: A machine or device capable of creating a noise level at the property upon which it is regularly located, including but not limited to: industrial and commercial process machinery and equipment, pumps, fans, air-conditioning apparatus or refrigeration machines.

Floodway: The stream channel and portion of the adjacent floodplain that must remain open to permit passage of the base flood.

Foot-candle: A unit of light intensity that represents the illumination given off by a single candle at a distance of one foot.

Re-gunning crane: A type of crane used in shipbuilding and repair that is particularly suited to lift heavy objects such as ship engines.

General Plan: The General Plan, adopted by the City Council or local governing board after public hearings and citizen input, is a comprehensive, long-range policy document that guides the ultimate physical development of a city or local government.

Geogrid: Synthetic fabric (fiberglass, polyester, treated steel, etc.) formed into nets with openings more than ¼ inch in size to allow the fabric to interlock with surrounding soil, rock, and other below-ground-level materials and to function as reinforcement.

Granular: Made up of very small grains.

Ground Acceleration: The speed at which soil or rock materials are displaced by seismic waves. It is measured as a percentage of the acceleration of gravity (0.5g = 50 percent of 32 feet per second squared, expressed as a vertical or horizontal force). *Peak* ground acceleration is the maximum acceleration expected from the characteristic earthquake predicted to affect a given area. Repeatable acceleration refers to the acceleration resulting from multiple seismic shocks. Sustained acceleration refers to the acceleration produced by continuous seismic shaking from a single, long-duration event.

Hazard Index (HI): The calculated ratio of predicted acute or chronic exposure of noncarcinogenic substance to a toxicity reference dose level for that particular substance. A Hazard Index (HI) threshold of 1 has been established by most regulatory agencies, including the RWQCB and BAAQMD for comparison purposes. Adverse health effects are not anticipated when chronic and acute hazard indices are less than one.

Hazard: Any situation that has the potential to cause damage to human health or the environment.

Hazardous air emission: In the context of *Public Resources Code* Section 21151.4 pertaining to hazardous materials emissions near schools, this refers to a material included on the list of hazardous air emissions (toxic air contaminants) established by the California Air Resources Board per Section 44321 of the *California Health and Safety Code*.

Hazardous material: Any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (*California Health and Safety Code*, Section 25501).

Hazardous materials release site: Any area, location, or facility where a hazardous material has been released or threatens to be released to the environment (*California Health and Safety Code*, Section 25260(e)).

Hazardous substance: See "hazardous material."

Hazardous waste: Waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in

serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (*California Health and Safety Code*, Section 25117.

Head: Head (hydraulic head, piezometric head, groundwater head) is a measurement, in length, of the elevation to which water will rise in a well. It is related to water pressure and density. Groundwater always flows from high head to low head.

Hydromodification: The change in the stream flow hydrograph (e.g., flow rate, timing of peak flows, flow duration, and flow volume).

Intact Archaeological Deposit: An archaeological deposit in which the original or stratified association of archaeological remains are retained within an archaeological site.

Interim target level (ITL): Calculated site-specific concentration of a chemical in soil that would be used to identify locations in Candlestick Point sub-areas not subject to Article 22A testing that could require risk management measures during project development.

Lead: Occurs in the atmosphere as particulate matter. Sources of lead include the manufacturing and recycling of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters.

Lithology: The physical character of a rock or rock formation.

Local Electrical Capacity: A function of the capacity of the transmission network to convey power to a service area, the capacity of the local substations to "step down" the power to deliverable voltages, and of the adequacy of the local distribution network to deliver power to end users.

Mélange: A mélange (French for "mixture") is a large body of rock characterized by a lack of bedding and includes rock fragments of all sizes contained in a fine-grained matrix. A mélange typically consists of a jumble of blocks of varied rock types.

Metamorphosed Rock: Metamorphosed rock is igneous or sedimentary rock that has been transformed, or 'metamorphosed', by intense heat and pressure (temperatures greater than 150 to 200 °C and pressures of 1500 bars) causing profound physical or chemical changes.

Micropascal: A measure of pressure per unit area where 1 micropascal equals 0.0000145 pounds per square inch.

Modified Mercalli Intensity (MMI) Scale: A 12-point scale of earthquake intensity based on local effects experienced by people, structures, and earth materials. Each succeeding step on the scale describes a progressively greater amount of damage at a given point of observation. Effects range from those which are detectable only by seismicity recording instruments (I) to total destruction (XII). Most people will feel Intensity IV ground motion indoors and Intensity V outside. Intensity VII frightens most people, and Intensity IX causes alarm approaching panic. The scale was developed in 1902 by Giuseppi Mercalli for European conditions, adapted in 1931 by American seismologists Harry Wood and Frank Neumann for conditions in North America, and modified in 1958 by Dr. Charles F. Richter to accommodate modern structural design features.

Moment Magnitude (M): A logarithmic scale introduced by Hiroo Kanamori in 1977 that is used by modern seismologists to measure the total amount of energy released by an earthquake. For the purposes of describing this energy release (i.e., the "size" of an earthquake on a particular fault segment for which seismic resistant construction must be designed) the moment magnitude (M) of the characteristic earthquake for that segment has replaced the concept of a maximum credible earthquake of a particular Richter magnitude. This has become necessary because the Richter scale "saturates" at the higher magnitudes; that is, the Richter scale has difficulty differentiating among the sizes of earthquakes above M 7.5. To correct for this effect, the formula used for the M scale incorporates parameters associated with the rock types at the seismic source and the area of the fault surface involved in the earthquake. Thus, the moment magnitude is related to the length and width of the fault rupture. It reflects the amount of "work" (in the sense of classical physics) done by the earthquake. The relationship between Richter and moment magnitudes is not linear (i.e., moment magnitude is not a set percentage of Richter magnitude): the two values are derived using different formulae. The four well-studied earthquakes listed below exemplify this relationship.

Location	*Date*	*Richter Magnitude*	*Moment Magnitude*
New Madrid MO	1812	8.7	8.1
San Francisco CA	1906	8.3	7.7
Anchorage AK	1964	8.4	9.2
Northridge CA	1994	6.4	6.7

Although some of the values shown on the M scale appear lower than those of the traditional Richter magnitudes, they convey more precise (and more useable) information to geologic and structural engineers.

Multi-Sector General Permit: Provides coverage for industrial facilities located in five states, in certain Native-American lands, as well as for various federal facilities, where USEPA is the NPDES permit authority.

Municipal Separate Storm Sewer System (MS4): An MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) *(i)* designed or used for collecting or conveying storm water, (ii) that is not a combined sewer, and (iii) that is not part of a Publicly Owned Treatment Works. The term MS4 also refers to the jurisdiction that operates such a system.

Native soil: Soil that exists in BWP project site that does not contain fill materials.

National Geodetic Vertical Datum (NGVD29): Equivalent to -1.77 feet based on the San Francisco City Datum, or roughly equivalent to mean sea level.

Naturalized Plants: Those that were originally installed as ornamental plantings but are now found growing 'naturally' in a variety of habitats.

Nitrogen Dioxide: A reactive, oxidizing gas capable of damaging cells lining the respiratory tract which is an essential ingredient in the formation of ozone.

North American and Pacific Plates: Tectonic plates that cover most of North America and the Pacific Ocean, respectively. These two plates have formed a transform boundary (where two plates grind past one another) on the western edge of California, along the San Andreas Fault system.

Oil and Grease (O&G): At very low concentrations, O&G can cause sheen on the surface of water. O&G can adversely affect aquatic life, create unsightly floating material, and make water undrinkable.

Offset Surface: Surfaces not in alignment, or offset, from each other that may have arisen from old landslides.

Orthents Soils: In USDA soil taxonomy, Orthents are defined as Entisols (soils that do not show any soil profile development) that lack horizon development due to either steep slopes or parent materials that contain no permanent weatherable minerals.

Outfall: An outfall is a pipe that discharges treated stormwater and wastewater flows into a receiving water body.

Overconsolidated: Subjected to an effective pressure greater than the pressure of the present.

Overflow: A pipe that discharges flows that exceed the capacity of the combined sewer system during heavy rain.

Ozone: A gas that is formed when reactive organic gases (ROG) and nitrogen oxides (NO_X)—both byproducts of internal combustion engine exhaust—undergo slow photochemical reactions in the presence of sunlight.

Pathogen Indicator Bacteria: Although they are not generally harmful themselves, these bacteria indicate the possible presence of disease-causing bacteria, viruses, and protozoa.

pH: A numeric measurement of the hydrogen-ion concentration in water.

Pier: A structure that extends out over the water.

Pollutant Loads: The amount of pollutants entering a water body, generally expressed in terms of mass released over a given time frame (e.g., pounds/day).

Polycyclic aromatic hydrocarbon (PAH): Organic chemical byproduct formed by the incomplete combustion of raw fuel materials, typically present as a constituent of heavy-end fuels (e.g., diesel) or other petroleum-based products such as asphalt.

Powered Construction Equipment: Any tools, machinery, or equipment used in connection with construction operations which can be driven by energy in any form other than manpower, including all types of motor vehicles when used in the construction process of any construction site, regardless of whether such construction site be located on-highway or off-highway, and further including all helicopters or other aircraft when used in the construction process except as may be preempted for regulation by state or federal law.

Quaternary: The geologic time period after the Neogene period, approximately 1.8 million years ago to the present.

Quay Wall: A wharf or bank that is constructed to accommodate the loading of ships and other vessels.

Reclaimed Complex Soils: Soils found on reclaimed land, such as tidal flats that were once part of San Francisco Bay.

Record of Decision: A signed federal document representing the culmination of the federal environmental document review and approval process, and documenting federal project environmental approval. Mitigation measures that will be incorporated in the project are typically summarized in an attached appendix.

Remedial action or **remediation:** Actions required by state or local laws, ordinances, or regulations necessary to prevent, minimize, or mitigate damage that may result from the release or threatened release of a hazardous material (*California Health and Safety Code*, Section 25260(g)). These actions include the cleanup of the site, monitoring, testing and analysis of site conditions, site operation and maintenance, and placing conditions or restrictions on the land use of the site upon completion of remedial actions.

Retention: Capturing stormwater runoff and preventing discharge from the detention device.

Respirable Particulate Matter: Extremely small, suspended particles or droplets 10 microns or smaller in diameter.

Reverse-slip Fault: A fault with predominantly vertical movement in which the upper block moves upward in relation to the lower block.

Richter Magnitude Scale: The Richter Magnitude Scale is a logarithmic scale developed during 1935 and 1936 by Dr. Charles F. Richter and Dr. Beno Gutenberg to measure earthquake magnitude by the amount of energy released, as opposed to earthquake intensity as determined by local effects on people, structures, and earth materials (as in the Modified Mercalli Intensity Scale). Each whole number on the Richter scale represents a 10-fold increase in amplitude of the waves recorded on a seismogram and about a 32-fold increase in the amount of energy released by the earthquake. Because the Richter scale tends to saturate above approximately M 7.5, it is being replaced in modern seismologic investigations by the moment magnitude (M) scale.

Risk: The probability of exposure to hazardous material and severity of harm that exposure would pose to human health or the environment, where the degree of risk is a function of the means of exposure, in addition to the inherent toxicity of the material.

San Francisco City Datum: A local vertical geodetic reference system specific to the City and County of San Francisco and formally established in 1964 as 8.616 feet above the National Geodetic Vertical Datum of 1929 (NGVD29), making it about 8.13 feet above mean sea level.

Seawall Lot: A parcel of land, generally located on the land side of a waterfront roadway, which was created when the seawall was built.

Semi-volatile organic compound (SVOC): An organic chemical that readily, but only partially, evaporates or changes from a liquid to gas at temperatures normally found at the ground surface and at shallow depths.

Serpentinite: A rock composed almost entirely of serpentine materials.

Shadow Fan/Shadow Trace: A figure identifying the maximum extent of all project-related shadows from one hour after sunrise to one hour before sunset for an entire year.

Shale Matrix: Shale, or mudstone, is a fine-grained sedimentary rock, usually formed from clay minerals compacted together by pressure. The matrix, or groundmass, is the fine-grained mass of material in which other larger grains are embedded within.

Shear Strength: Describes the maximum strength of soil at which point significant plastic deformation (yielding) occurs due to an applied shear stress.

Shear Zone: A wide zone of sheared rock, where intense foliation and deformation may occur. The zone may be associated with a fault, but it is often difficult to distinguish a fault plane in the zone.

Sheet Piles: Flat metal "boards" that are driven into the substrate with a pile driver. They interlock with each other to form a vertical water tight wall.

Specific Conductance (SC): A numerical expression of the ability of water to carry an electric current.

Subduction: An area where two tectonic plates converge and move towards one another, with one sliding underneath the other and moving down into the earth's mantle, part of the earth's internal structure.

Sulfur Dioxide: A colorless, extremely irritating gas or liquid.

Surcharging: Overloading and flooding of the drainage system.

Terrane: A crustal block or fragment that is typically bounded by faults which has a geologic make-up distinct from those of surrounding areas.

Total Organic Carbon (TOC): An indicator of the total organic matter present in water.

Total petroleum hydrocarbons (TPH): Fuel products such as diesel, gasoline, and motor oil containing organic chemical compounds of varying types and concentrations that are specific to type product.

Total Suspended Solids (TSS): An indicator of the undissolved solids in stormwater runoff.

Toxic: Concentration of a substance that would be lethal or produce other adverse responses detrimental to the health of an organism.

Toxic Hot Spots: Locations in enclosed bays, estuaries, or the ocean where pollutants have accumulated in the water or sediment to levels that (1) may pose a hazard to aquatic life, wildlife, fisheries, or human health; (2) may impact beneficial uses; or (3) exceed State Water Resources Control Board or Regional Water Quality Control Board-adopted water quality or sediment quality objectives.

Treatability Studies: Pilot-scale type tests conducted at hazardous wastes sites to determine if a treatment technology will work for that site's particular set of environmental conditions.

Urban Land: Per USDA soil taxonomy, Urban Land is soil that has been modified by disturbance of the natural layers with additions of fill material several feet thick to accommodate large industrial and housing installations.

Volatile Organic Compound (VOC): An organic chemical that readily evaporates at temperatures normally found at the ground surface and at shallow depths.

Waffling Grade: A surface texture marked by ridges and valleys that would help to channel flow.

Waste Discharge Requirement (WDR): WDRs are regulatory requirements pertaining to water quality. WDRs may apply to a general activity or program (e.g., construction runoff) or they may be specific to a particular facility. An NPDES permit is an example of a type of WDR.

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