



Final Environmental Impact Report
**CANDLESTICK POINT–HUNTERS POINT SHIPYARD PHASE II
DEVELOPMENT PLAN PROJECT**

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

**SAN FRANCISCO REDEVELOPMENT AGENCY
File No. ER06.05.07**

**CITY AND COUNTY OF SAN FRANCISCO PLANNING DEPARTMENT
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San Francisco Redevelopment Agency
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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.

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.

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.

- ① 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.

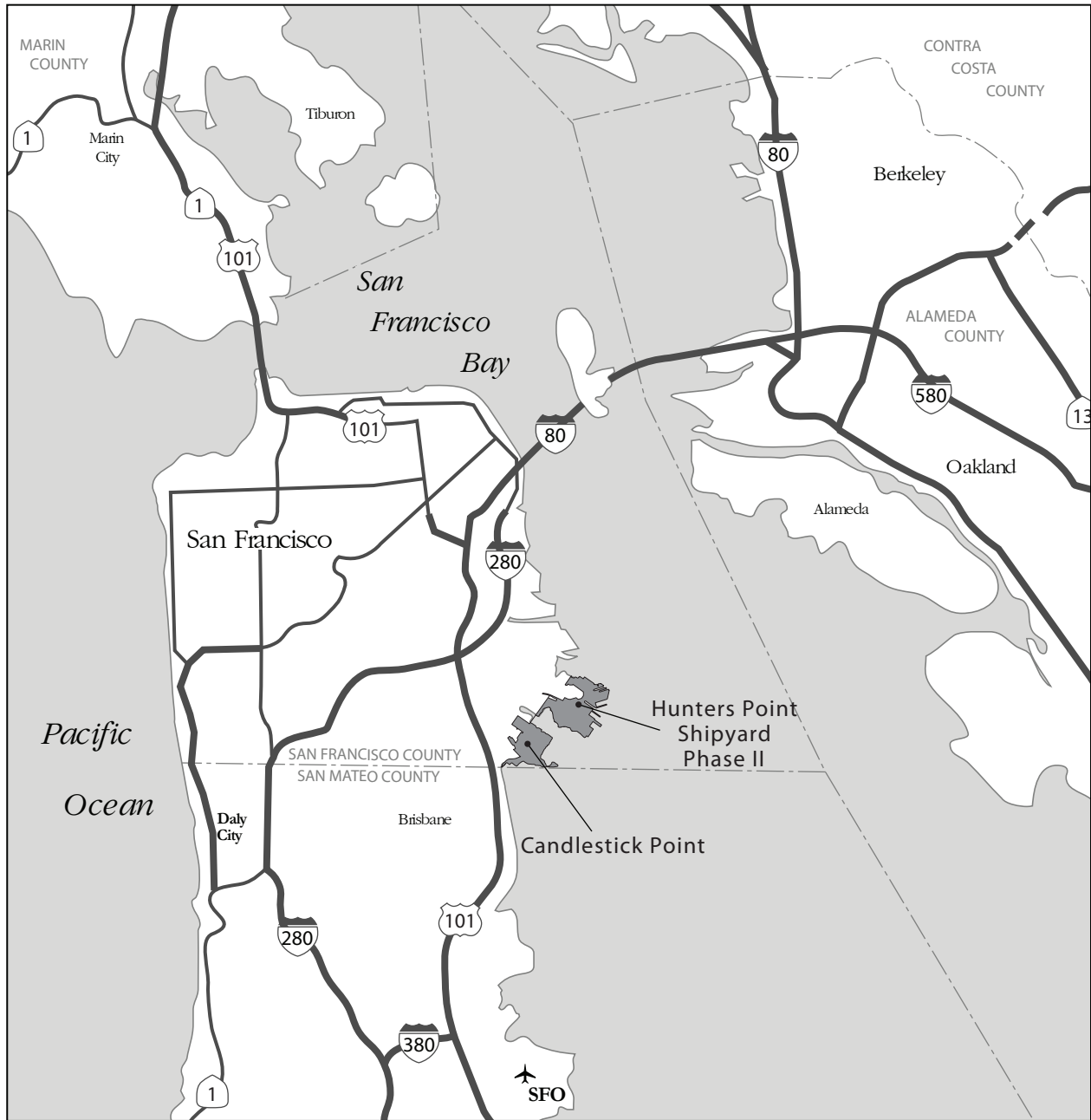
Table II-1 Project Site Areas	
<i>Development Area</i>	<i>Acres</i>
Candlestick Point	281
Hunters Point Shipyard Phase II	421
Total	702

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.

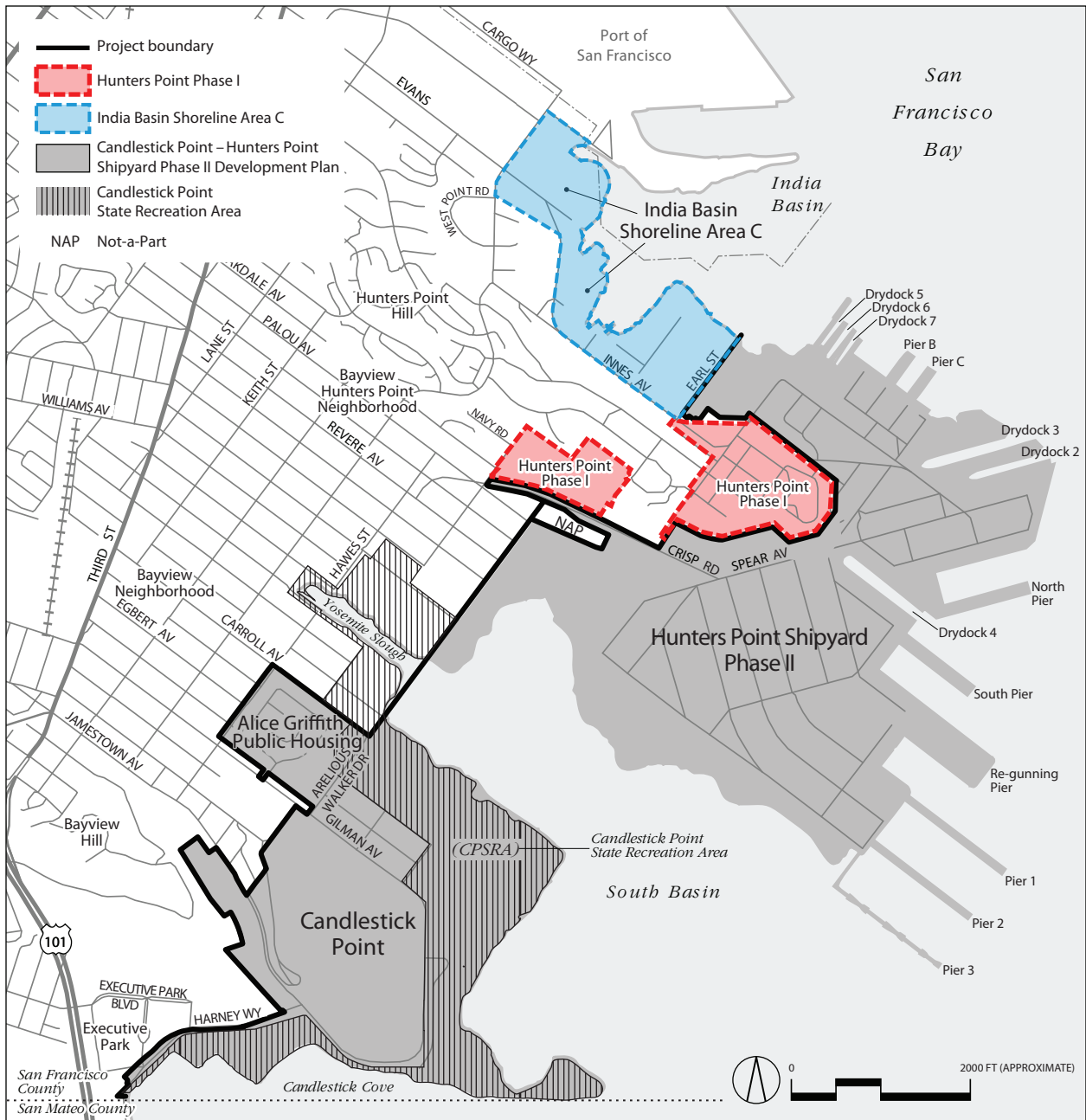


SOURCE: Clement Designs, 2008.

PBS&J 04.19.10 02056 | JCS | 10

Candlestick Point — Hunters Point Shipyard Phase II EIR
PROJECT LOCATION

FIGURE II-1



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

PBS&J 04.19.10 02056 | JCS | 10

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 Road²⁹ 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

	<i>Existing Uses</i>	<i>Existing Uses to Be Retained</i>	<i>Proposed Uses</i>	<i>Total</i>
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
<i>Subtotal Residential</i>	<i>256</i>	<i>256</i>	<i>10,244</i>	<i>10,500</i>
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	225,000 ^c	225,000	30,000	255,000
Community Services (gsf)	0	0	100,000	100,000
<i>Subtotal Nonresidential</i>	<i>238,500</i>	<i>225,000</i>	<i>3,815,000</i>	<i>4,040,000</i>
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
<i>Subtotal Parks and Open Space</i>	<i>120.2</i>	<i>91.0</i>	<i>245.4</i>	<i>336.4</i>

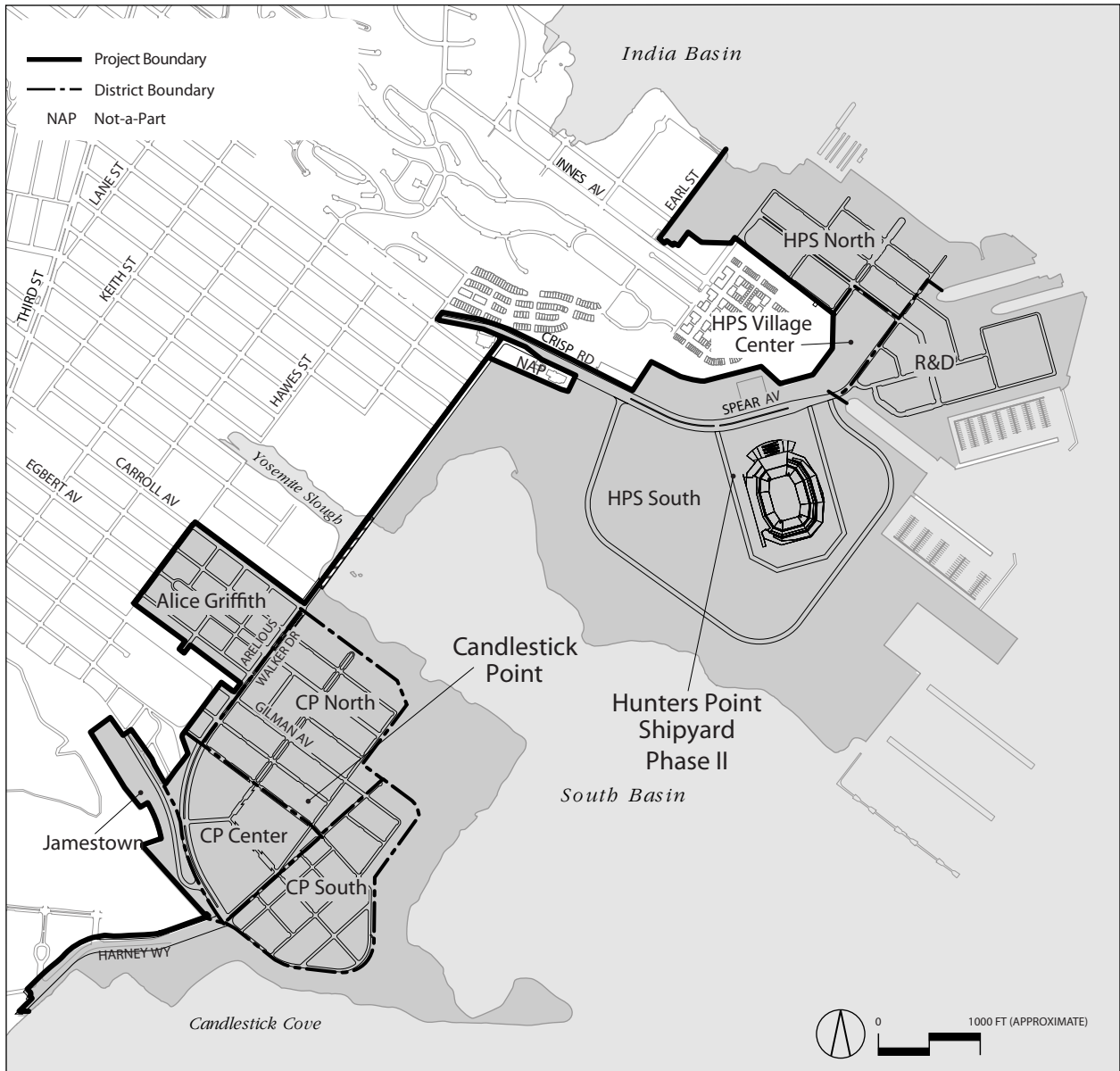
SOURCE: Lennar, 2009

- 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			
<i>Land Use</i>	<i>Candlestick Point</i>	<i>Hunters Point Shipyard Phase II</i>	<i>Total</i>
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
<i>Total (units)</i>	<i>7,850</i>	<i>2,650</i>	<i>10,500</i>
Retail			
Regional Retail (gsf)	635,000	N/A	635,000
Neighborhood Retail (gsf)	125,000	125,000	250,000
<i>Total (gsf)</i>	<i>760,000</i>	<i>125,000</i>	<i>885,000</i>
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
<i>Total (acres)</i>	<i>104.8</i>	<i>231.6</i>	<i>336.4</i>
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.

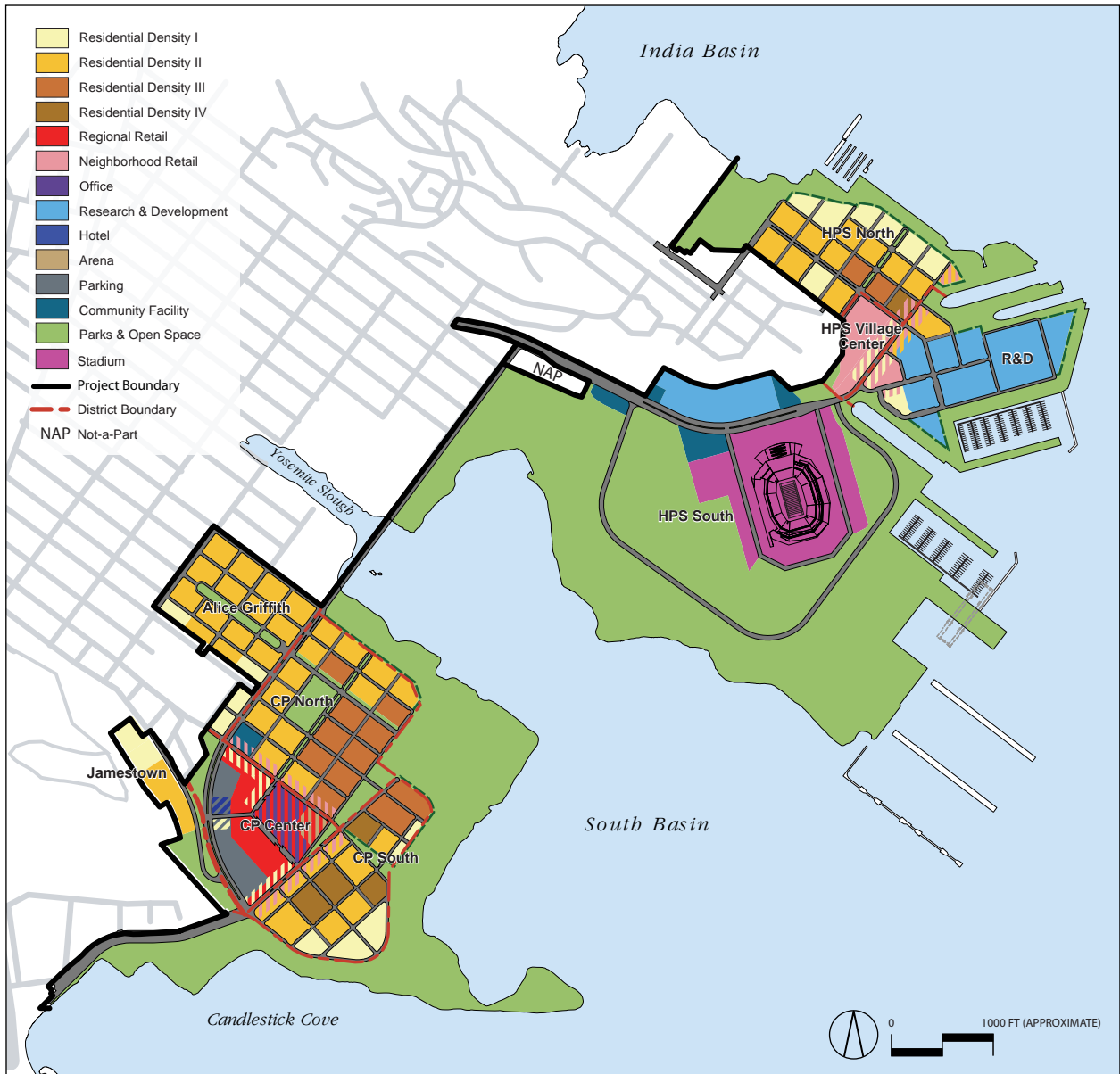


SOURCE: San Francisco Redevelopment Agency, Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
PROPOSED DISTRICTS

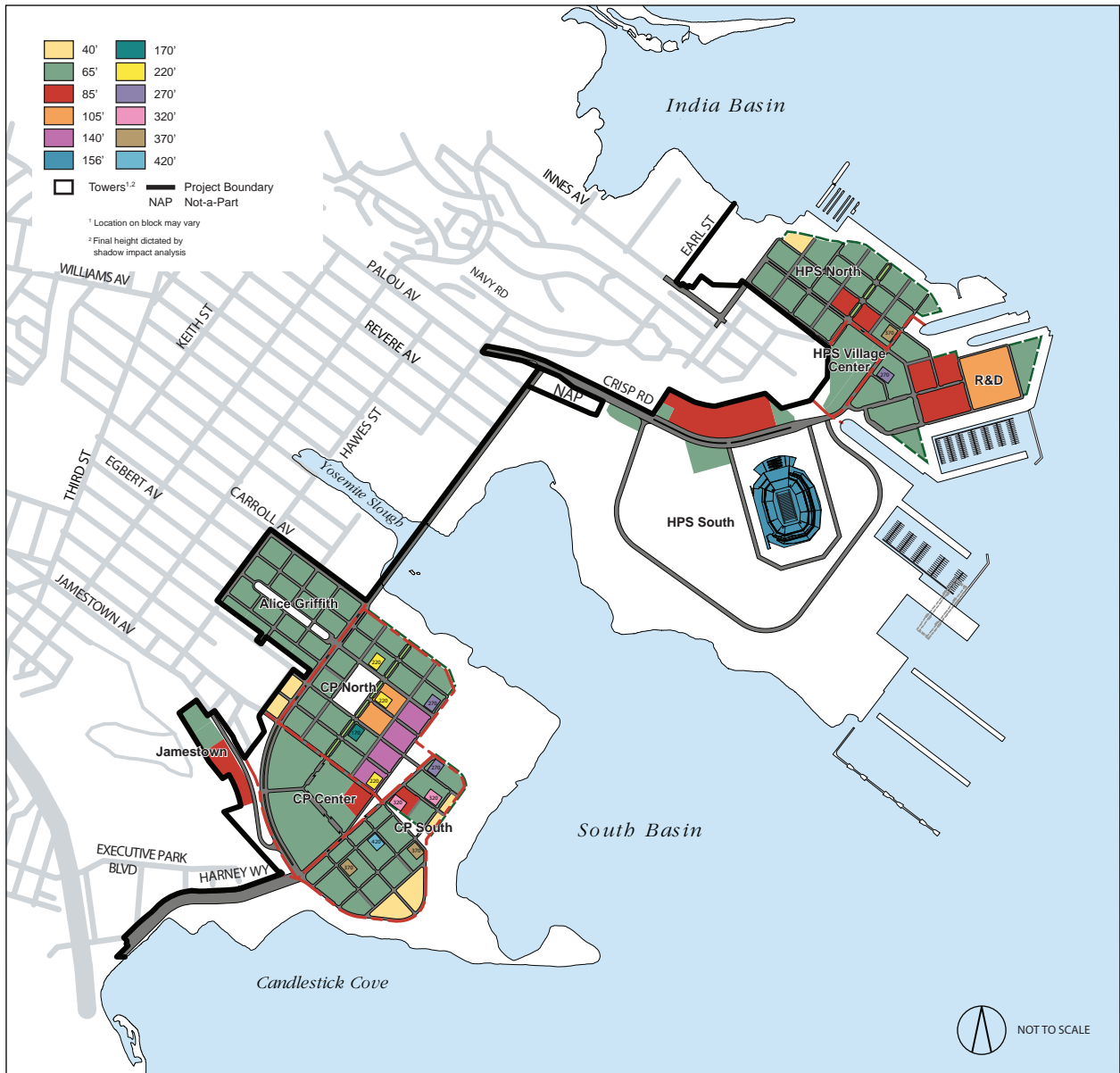
FIGURE II-3



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
PROPOSED MAXIMUM BUILDING HEIGHTS

FIGURE II-5

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 acre³²): 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											
<i>District</i>	<i>Net Acres^a</i>	<i>Number of Residential Units^b</i>	<i>Density</i>	<i>Regional Retail (gsf)</i>	<i>Neighborhood Retail (gsf)</i>	<i>Hotel (gsf)</i>	<i>Office (gsf)</i>	<i>Arena (gsf)</i>	<i>Community Services (gsf)</i>	<i>Total Commercial (gsf)</i>	<i>Parks (acres)</i>
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 through 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

<i>District</i>	<i>Net Acres^a</i>	<i>Dwelling Units^b</i>	<i>Density</i>	<i>Neighborhood Retail (gsf)</i>	<i>Artist Space (gsf)</i>	<i>R & D (gsf)</i>	<i>Community Services (gsf)^c</i>	<i>Total Commercial (gsf)</i>	<i>Football Stadium (Seats)</i>	<i>City Parks (acres)</i>
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

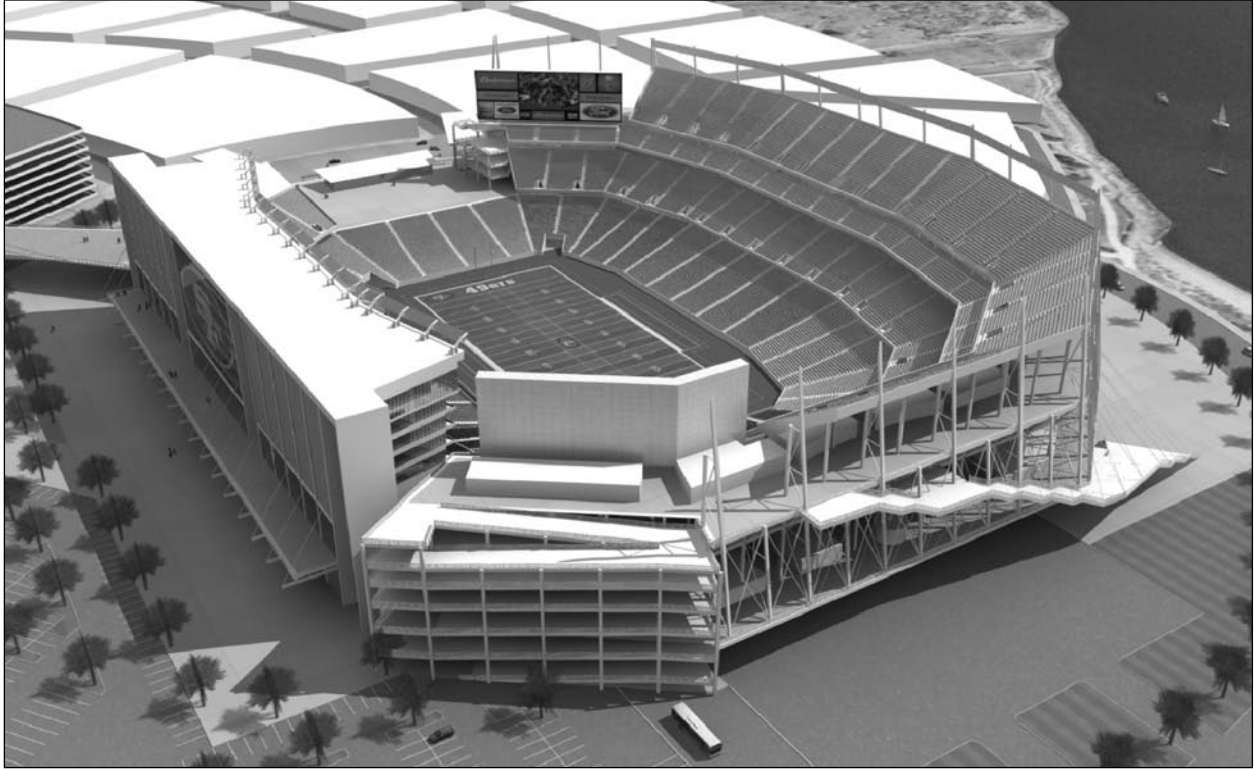
The HPS South district would include 500,000 gsf of R&D space, office, and light industrial uses on approximately 15 net acres. These uses could be located north of Crisp Road, northwest of the proposed new stadium. Maximum heights of the R&D structures would be 85 feet. In addition, this district would 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.



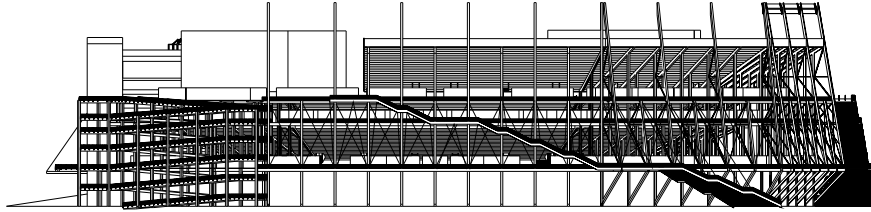
SOURCE: HNTB Architects, 2007.

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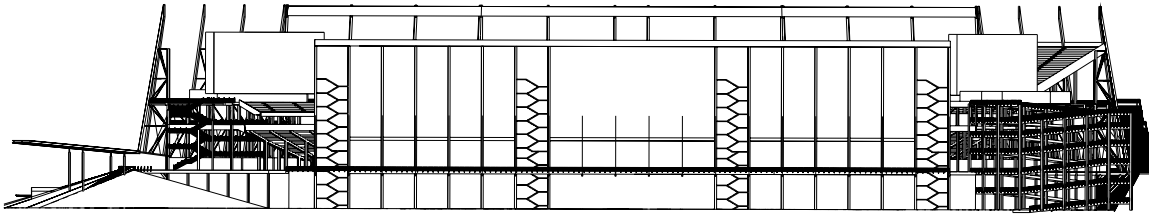
FIGURE II-6



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.

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.

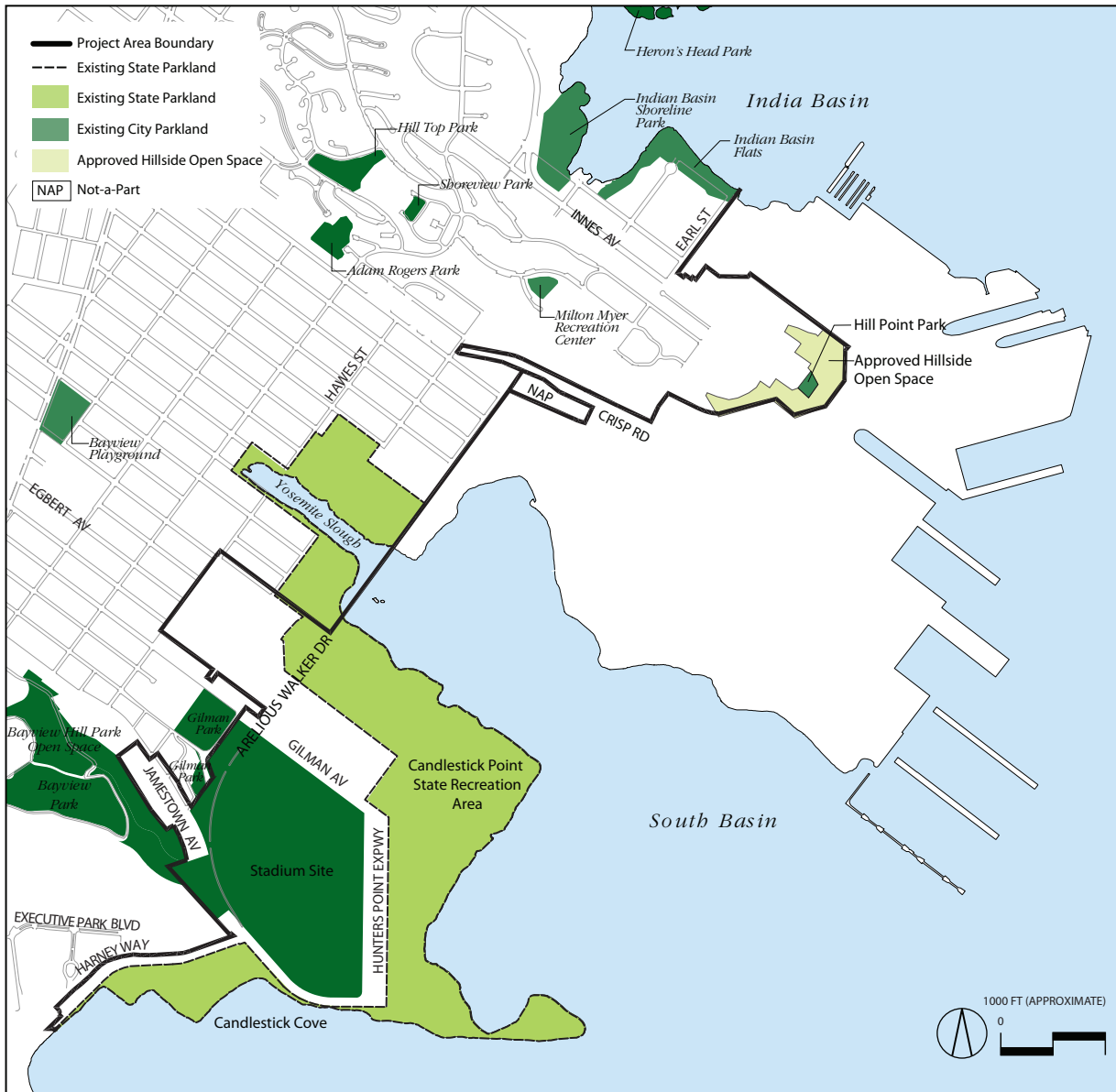
■ Candlestick Point State Recreation Area

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
	<i>Subtotal</i>	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
	<i>Subtotal</i>	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
	<i>Subtotal</i>	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
	<i>Subtotal</i>	91.6
	Total	231.6
TOTAL PARKS AND OPEN SPACE		
New Parks		
New Dual-Use Sports Fields/Multi-Use Lawn and Active Urban Recreation		148.1
Existing State Parkland Improved (including 23.7 net loss of CPSRA)		91.6
	Total	336.4

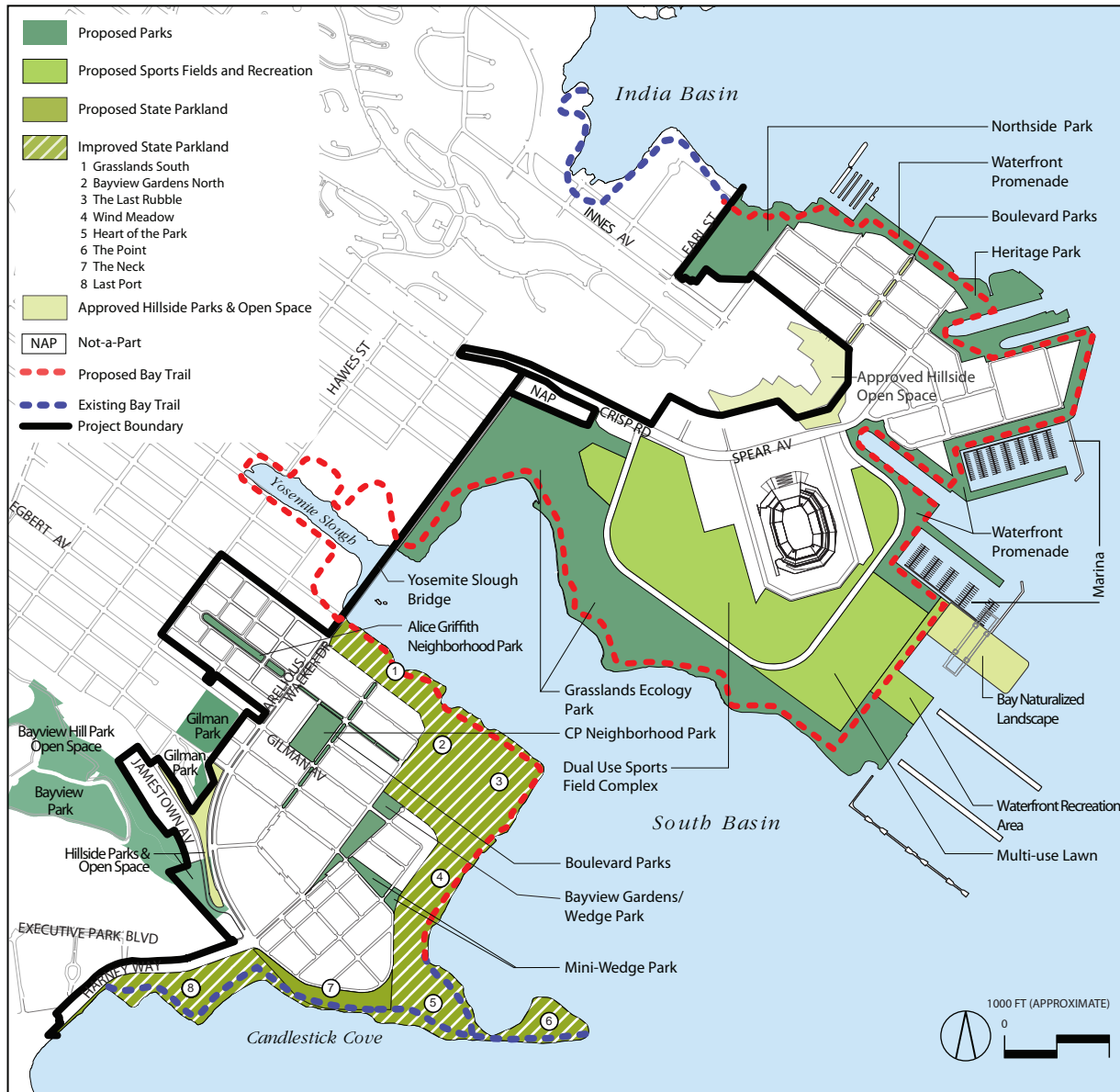
SOURCE: Lennar Urban, 2009.

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.



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

	<i>Candlestick Point (acres)</i>
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.

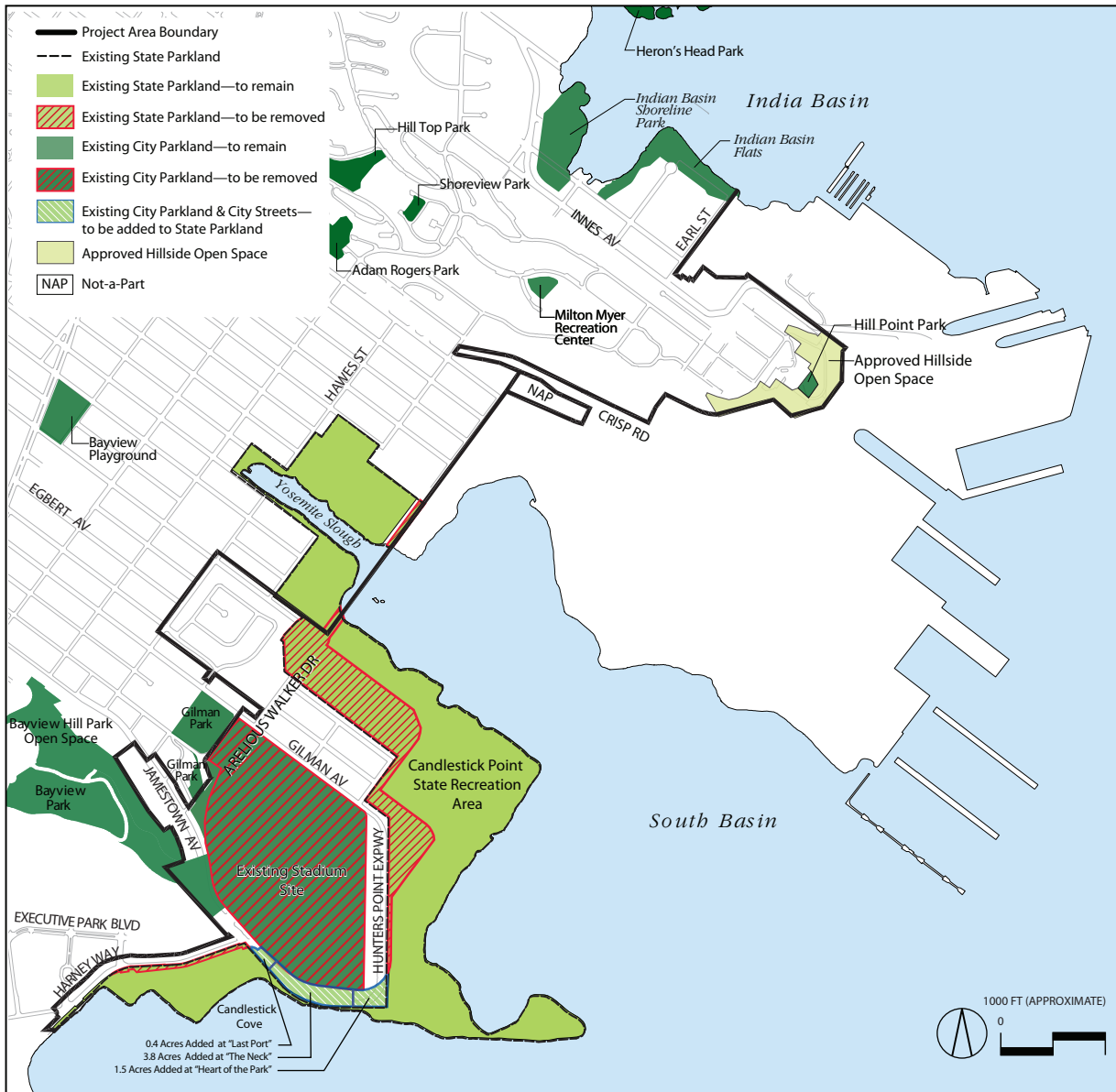
- The current *Candlestick Point State Recreation Area General Plan* was approved in 1978 and amended in 1987 and directs the long-range development and management of the recreation area.³⁹ Prior to construction of park improvements, the California Department of Parks and Recreation (CDPR) must undertake 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).

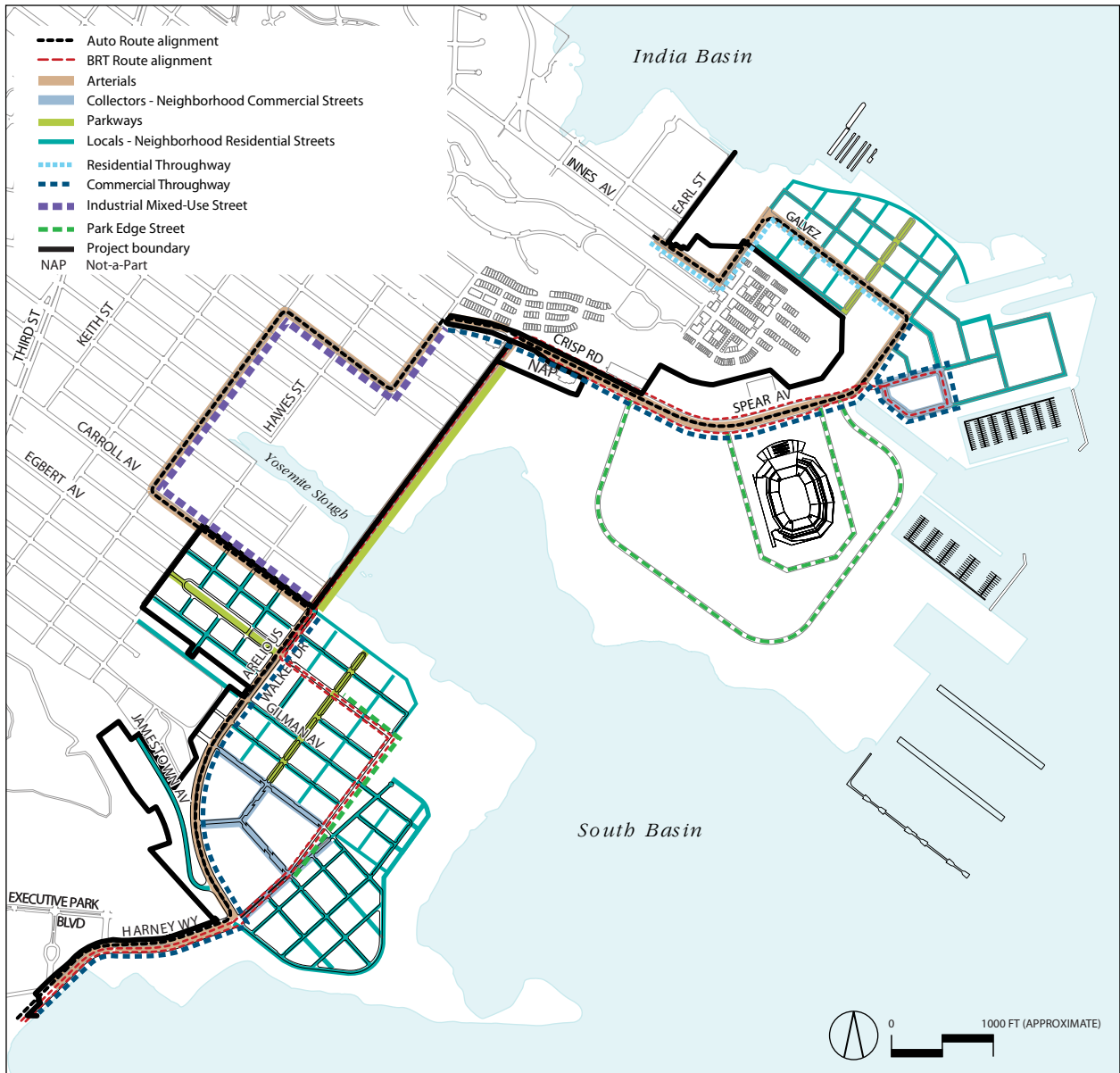
Roadway Improvements

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

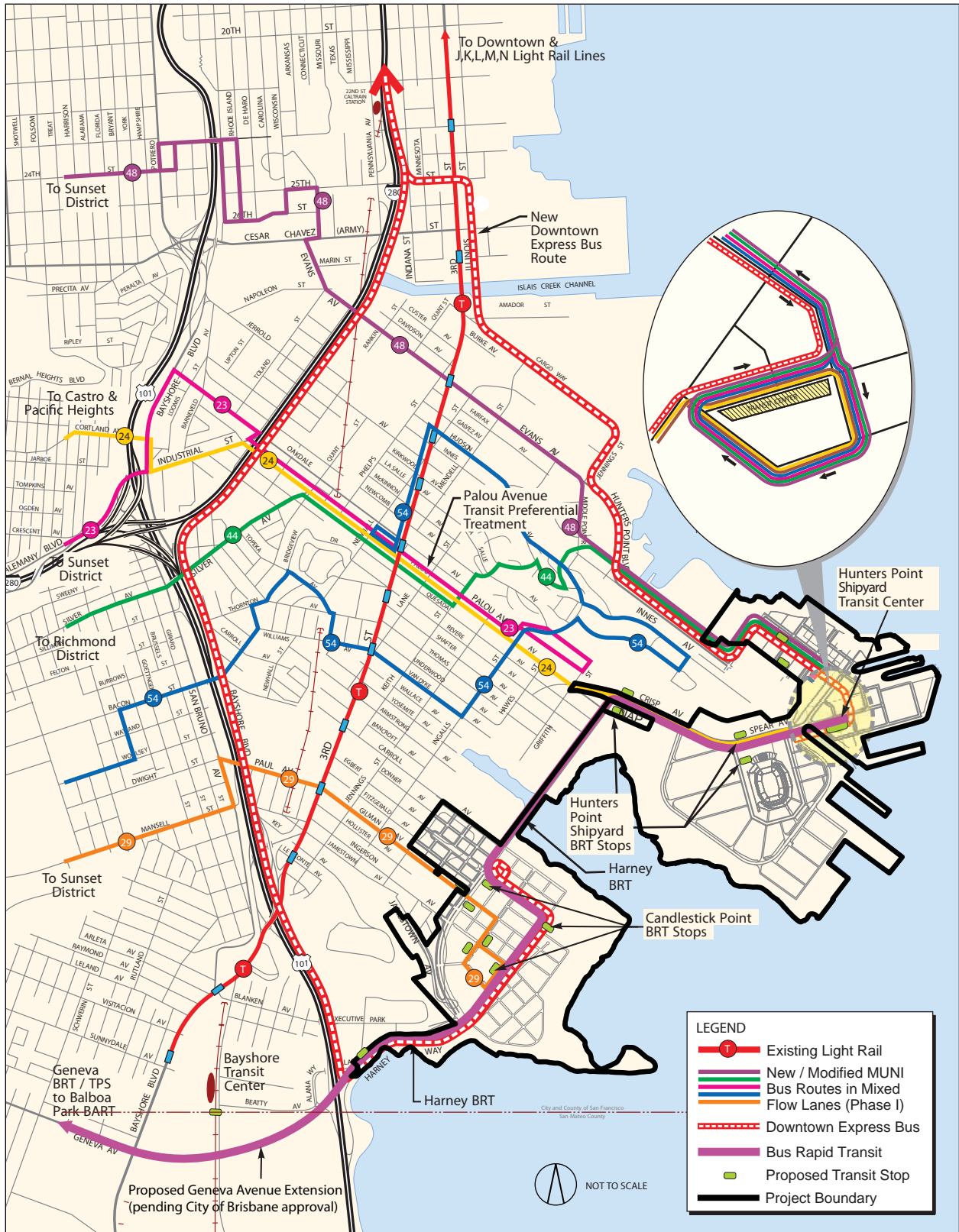
Supported by Project revenues and infrastructure, the San Francisco Municipal Transportation Agency proposes the following transit services:

- 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.

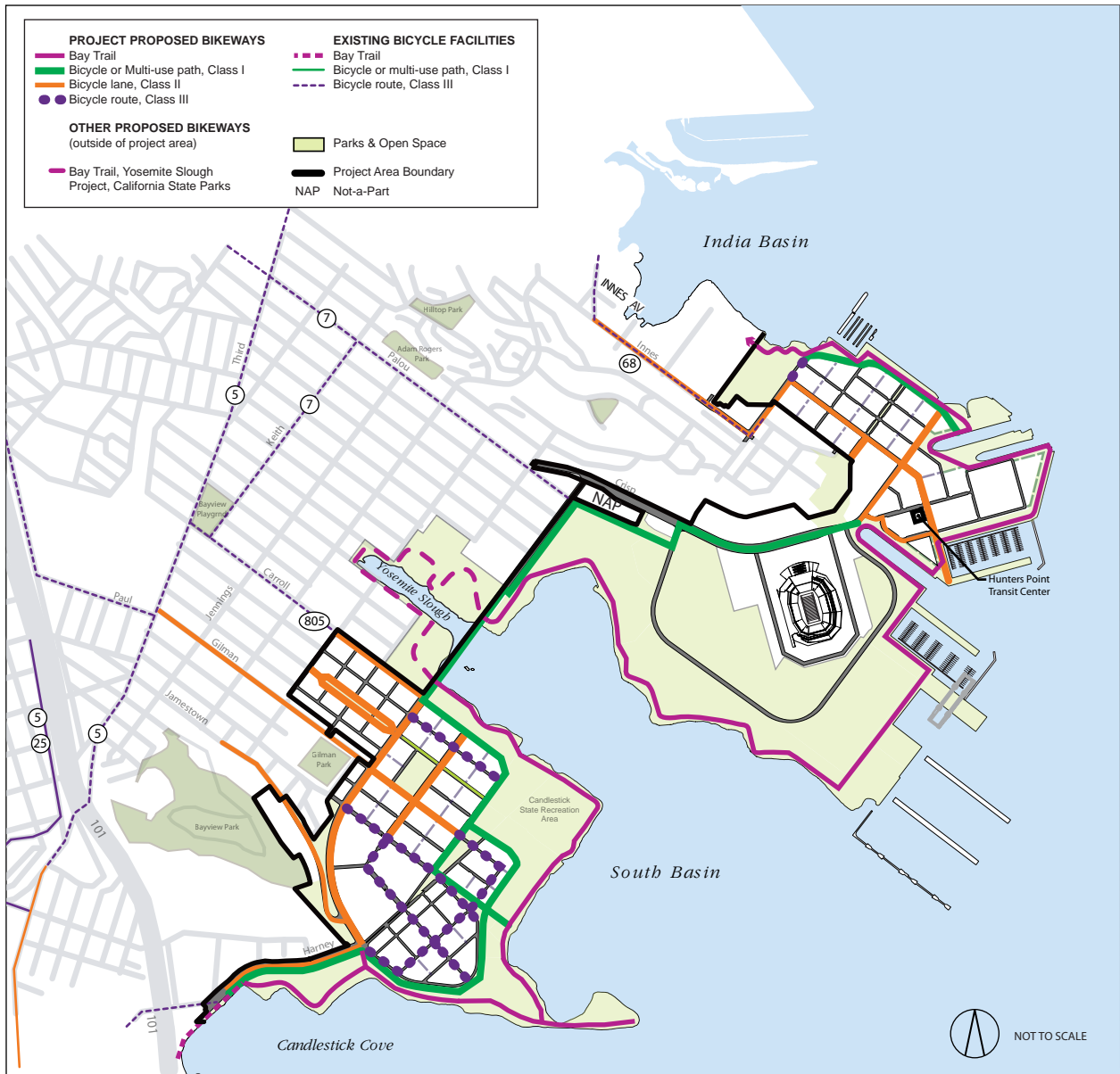
Table II-8 Proposed Bicycle Parking and Shower and Locker Facilities		
<i>Use or Activity</i>	<i>Parking or Facility</i>	<i>Size of Project</i>
Residential	One Class 1 bicycle space per 2 units	Up to 50 units
	25 Class 1 bicycle spaces plus 1 Class 1 space for every 4 units over 50	Over 50 units
Medical, 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	25,000 and 50,000 gsf
	Two showers, four clothes lockers	50,001 and 100,000 gsf
	Four showers, eight clothes lockers	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
PROPOSED BICYCLE ROUTES

FIGURE II-14

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.

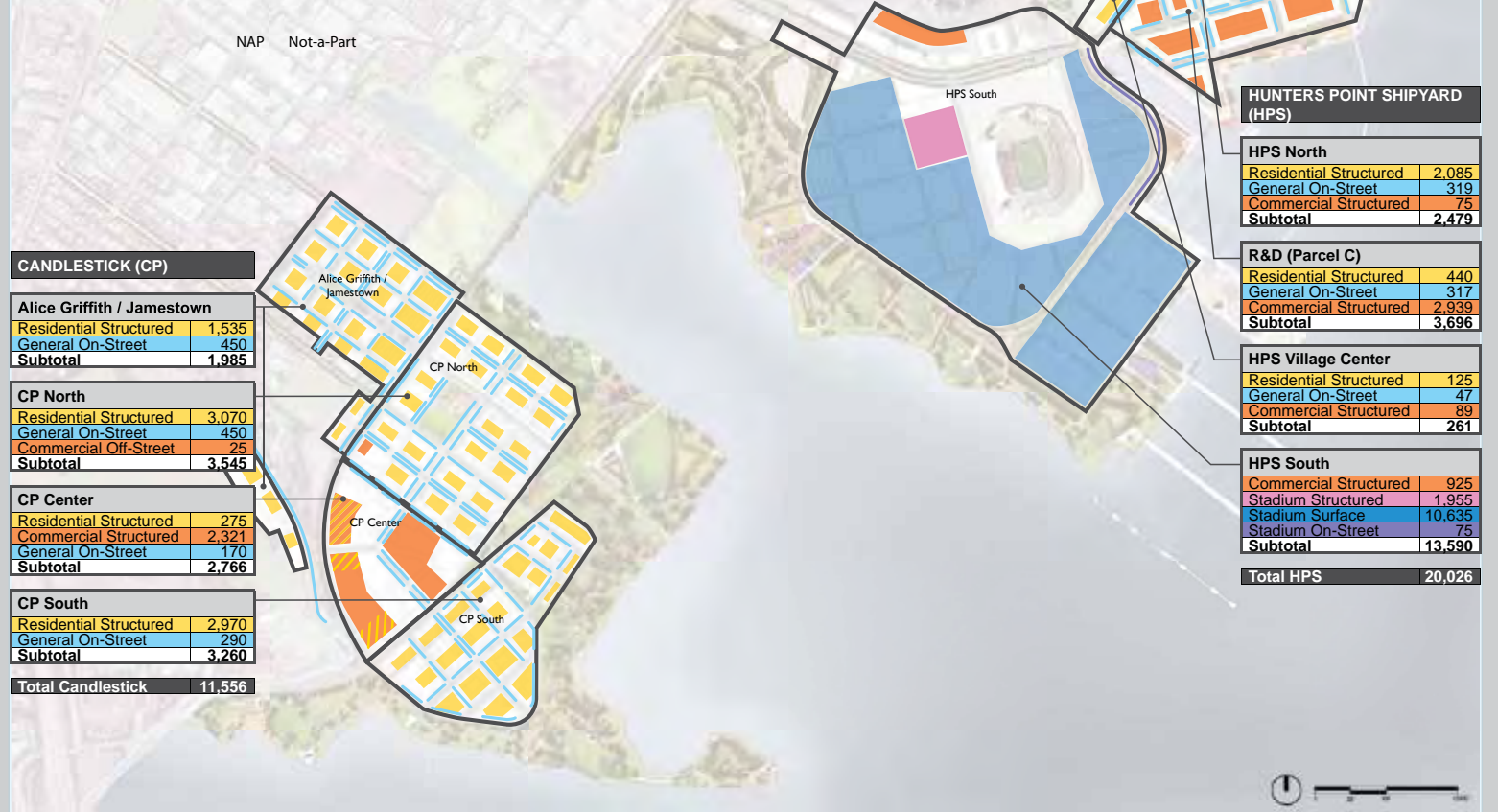
Use or Activity	Table II-9 Maximum Proposed Parking	
	Hunters Point Shipyard Phase II	Candlestick Point
Residential	1 for each dwelling unit	1 for each dwelling unit
Retail (Neighborhood Commercial)	3 for each 1,000 sf of occupied floor area where the floor area exceeds 5,000 sf	0
Retail (Regional)	—	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		
<i>Land Use</i>	<i>Size of Use</i>	<i>Number of Spaces</i>
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 plumbing⁴¹ 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:

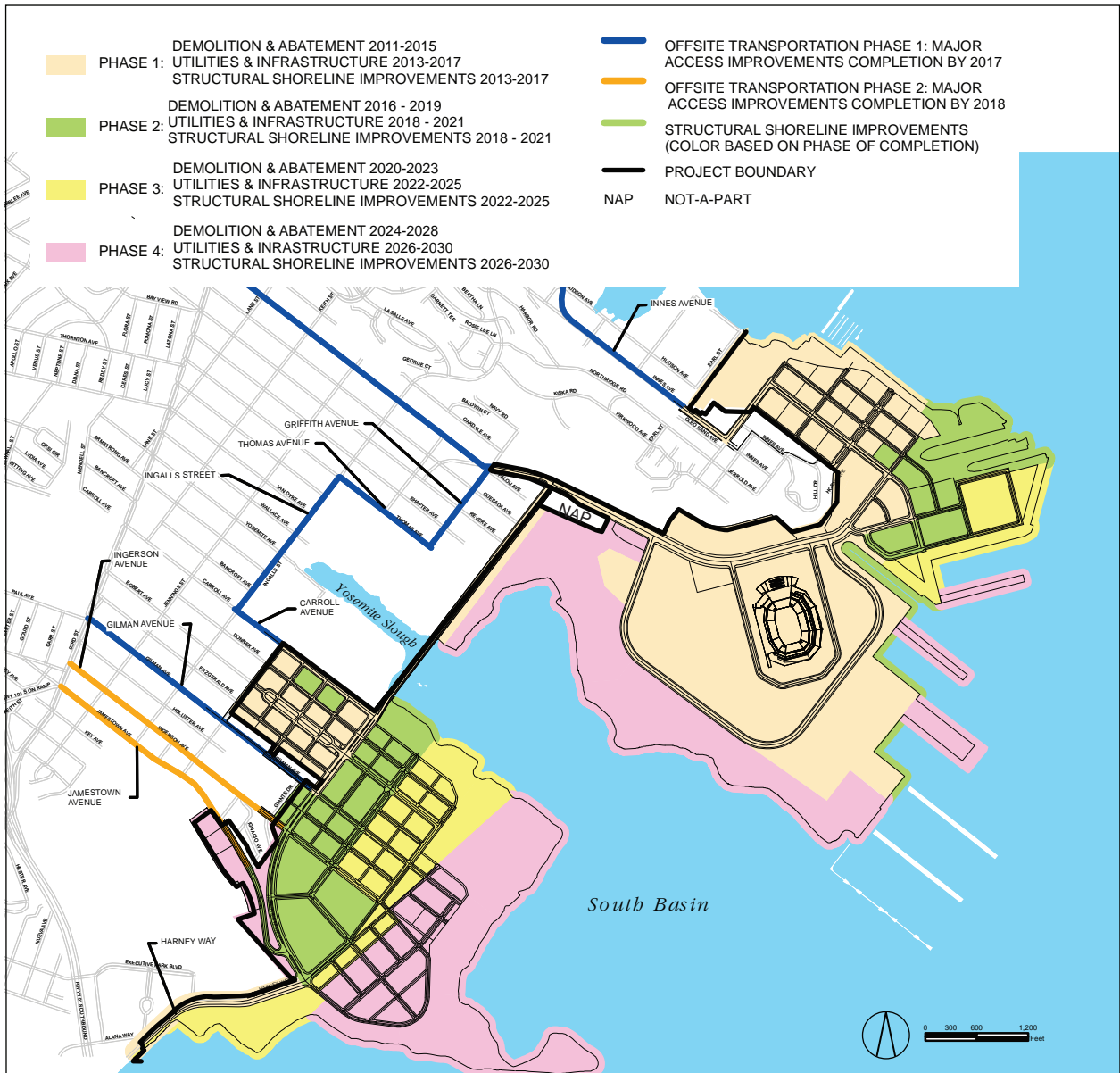
- Compact, infill development (including 90 percent of the new buildings fronting on public streets or open space)
- Enhanced habitat values
- Brownfield remediation and urban reuse
- Close proximity to transit and bicycle networks (75 percent of all development would be within ¼-mile walk to a transit 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.

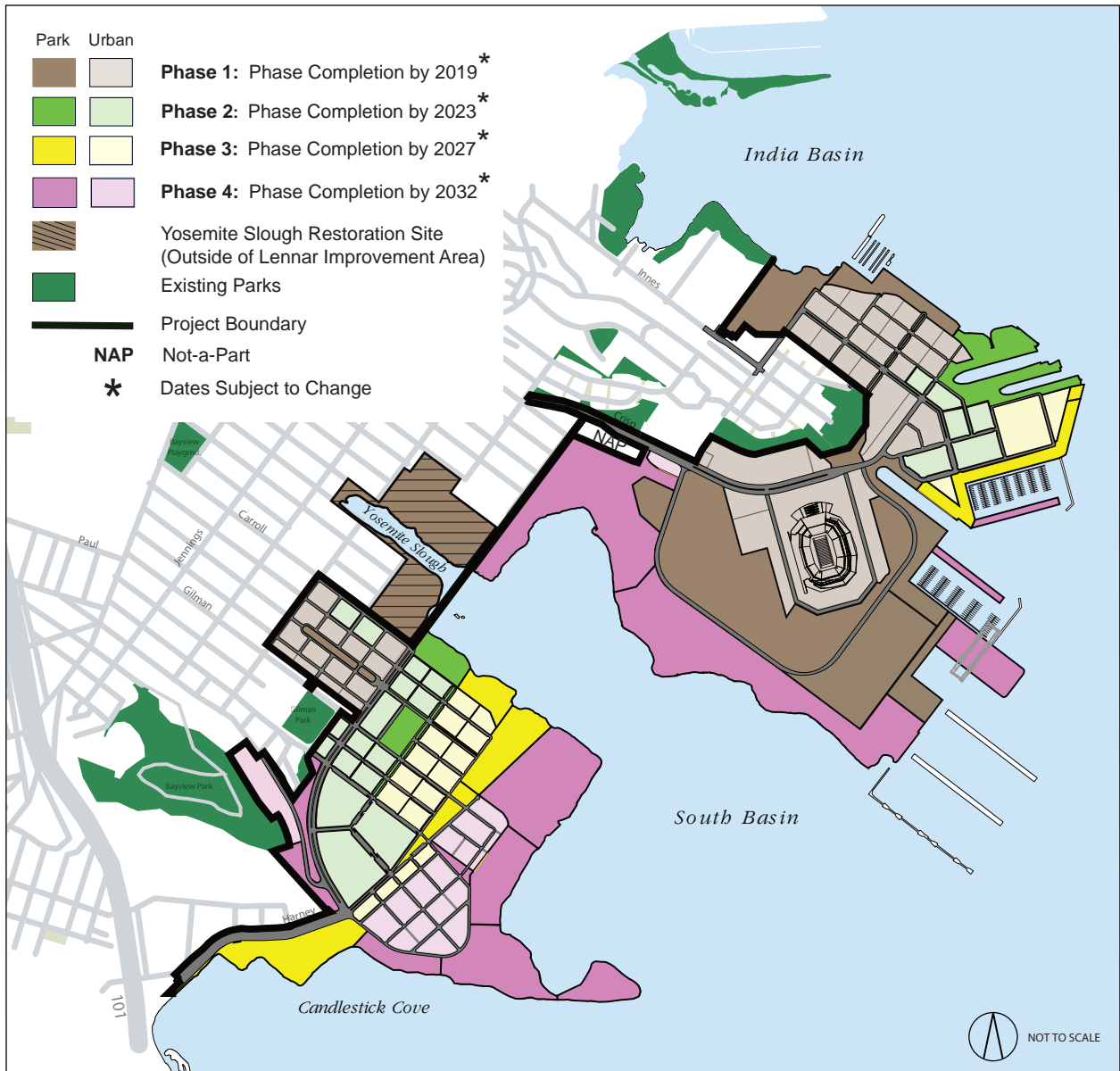


SOURCE: MACTEC, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
PROPOSED SITE PREPARATION SCHEDULE

FIGURE II-16



SOURCE: Lennar Urban, 2010.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
PROPOSED BUILDING AND PARKS CONSTRUCTION SCHEDULE

FIGURE II-17

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
<i>Subtotal</i>	<i>214,382</i>	<i>26,611</i>	<i>104,283</i>	<i>79,405</i>	<i>424,681</i>
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
<i>Subtotal</i>	<i>216,602</i>	<i>137,572</i>	<i>74,480</i>	<i>118,450</i>	<i>547,104</i>
Total	430,984	164,183	178,763	197,855	971,785

SOURCE: Lennar Urban, 2009.

- Concrete debris can be sized and recycled on site as pipe bedding or road base
- Wood debris can be chipped and composted.
- Scrap steel can be recycled off site.
- Miscellaneous debris including glass, asphalt, plastic, etc would be transported and disposed of at a local landfill.
- Asphalt included in Miscellaneous Debris may be recycled.
- 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		
	<i>Candlestick Point (cubic yards)</i>	<i>Hunters Point High Grade (cubic yards)</i>
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 shoreline⁴⁵ 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 investigation⁴⁶ 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 riprap 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

Parcel or Area	Location	Proposed Use	Proposed Shoreline Improvements										Estimated Change in Shoreline Location (feet) ^d
			Repairs			Modifications							
			Deck	Piles	Walls	Riprap	Remove	Remove Portion	Slope Top of Wall	New Buttress	Sandy Beach	Tidal Habitat	
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	0

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

Parcel or Area	Location	Proposed Use	Proposed Shoreline Improvements										Estimated Change in Shoreline Location (feet) ^d
			Repairs					Modifications					
			Deck	Piles	Walls	Riprap	Remove	Remove Portion	Slope Top of Wall	New Buttress	Sandy Beach	Tidal Habitat	
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

<i>Parcel or Area</i>	<i>Location</i>	<i>Proposed Use</i>	<i>Existing Shoreline Conditions</i>	<i>Proposed Improvement Concepts</i>
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.	<p>Improve the present riprap edge along the shoreline to required elevations (placing riprap) to remain consistent with the present configuration.</p> <p>At the two reaches where opportunities exist for a natural edge, lay back the slope at a flatter configuration and plant marsh plantings.</p>
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.	<p>Improve the present riprap edge along the shoreline to required elevations (placing riprap) to remain consistent with the present configuration.</p> <p>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.</p>
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	<p>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.</p> <p>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.</p>	<p>This portion of shoreline will be improved to a riprap revetment by the Navy.</p> <p>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:</p> <ul style="list-style-type: none"> ■ 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	Waterfront Promenade	<p>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.</p> <p>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).</p> <p>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).</p> <p><u>Riprap-Protected Slope East of Berth 55 (Heritage Park)</u></p> <p>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.</p>	<p>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:</p> <ul style="list-style-type: none"> ■ 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. <p><u>Riprap Protected Slope East of Berth 55 (Heritage Park)</u></p> <p>This portion of shoreline will be improved to a riprap revetment by the Navy.</p>
C	Drydock 3	Heritage Park	<p>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.</p>	<p>The drydock is proposed to remain at its current configuration but with the following modifications:</p> <ul style="list-style-type: none"> ■ 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

<i>Parcel or Area</i>	<i>Location</i>	<i>Proposed Use</i>	<i>Existing Shoreline Conditions</i>	<i>Proposed Improvement Concepts</i>
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: <ul style="list-style-type: none"> ■ 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		<p>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.</p> <p>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.</p>	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: <ul style="list-style-type: none"> ■ 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

<i>Parcel or Area</i>	<i>Location</i>	<i>Proposed Use</i>	<i>Existing Shoreline Conditions</i>	<i>Proposed Improvement Concepts</i>
	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	<p>The shoreline along Berth 14 was constructed exactly the same as for Berths 3 through 5 (timber crib structure).</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p><u>Berth 14 (Waterfront Promenade)</u></p> <p>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.</p> <p><u>Berths 16 through 20 (Wildlife Habitat)</u></p> <p>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:</p> <ul style="list-style-type: none"> ■ 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

<i>Parcel or Area</i>	<i>Location</i>	<i>Proposed Use</i>	<i>Existing Shoreline Conditions</i>	<i>Proposed Improvement Concepts</i>
	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.	<u>Berth 15 (Waterfront Promenade)</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 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. <u>Riprap Protected Slope (Grasslands Ecology Park)</u> 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). <u>Riprap Protected Slope (Grasslands Ecology Park)</u> 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

<i>Parcel or Area</i>	<i>Location</i>	<i>Proposed Use</i>	<i>Existing Shoreline Conditions</i>	<i>Proposed Improvement Concepts</i>
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.



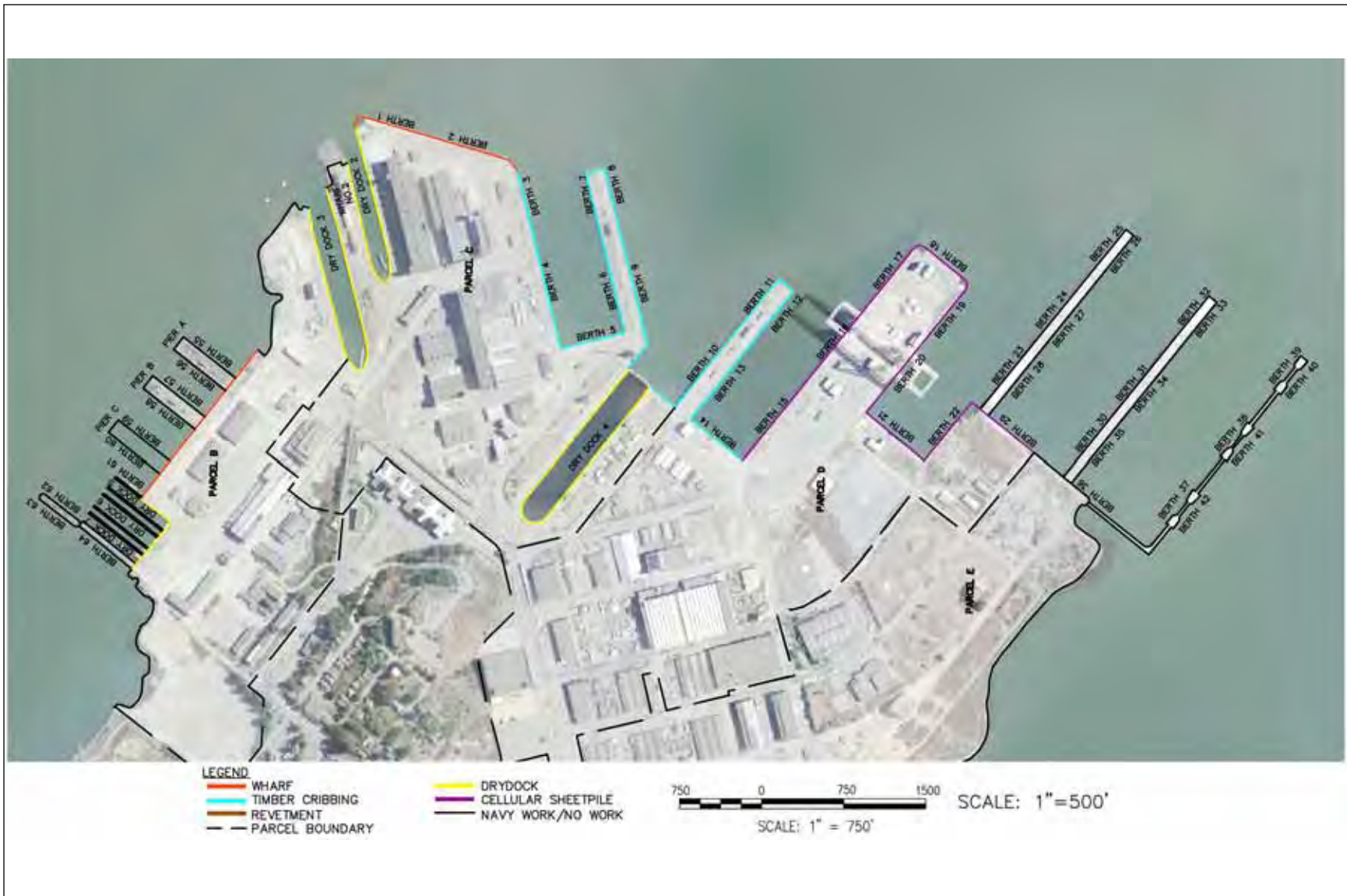
SOURCE: Moffat & Nichol Engineers, 2009; PBS&J, 2009.

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.

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FIGURE II-20



Candlestick Point — Hunters Point Shipyard Phase II EIR
NATURAL SHORELINE RECOMMENDED WORK MAP

A project specific SLR study was undertaken³³ 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.

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.



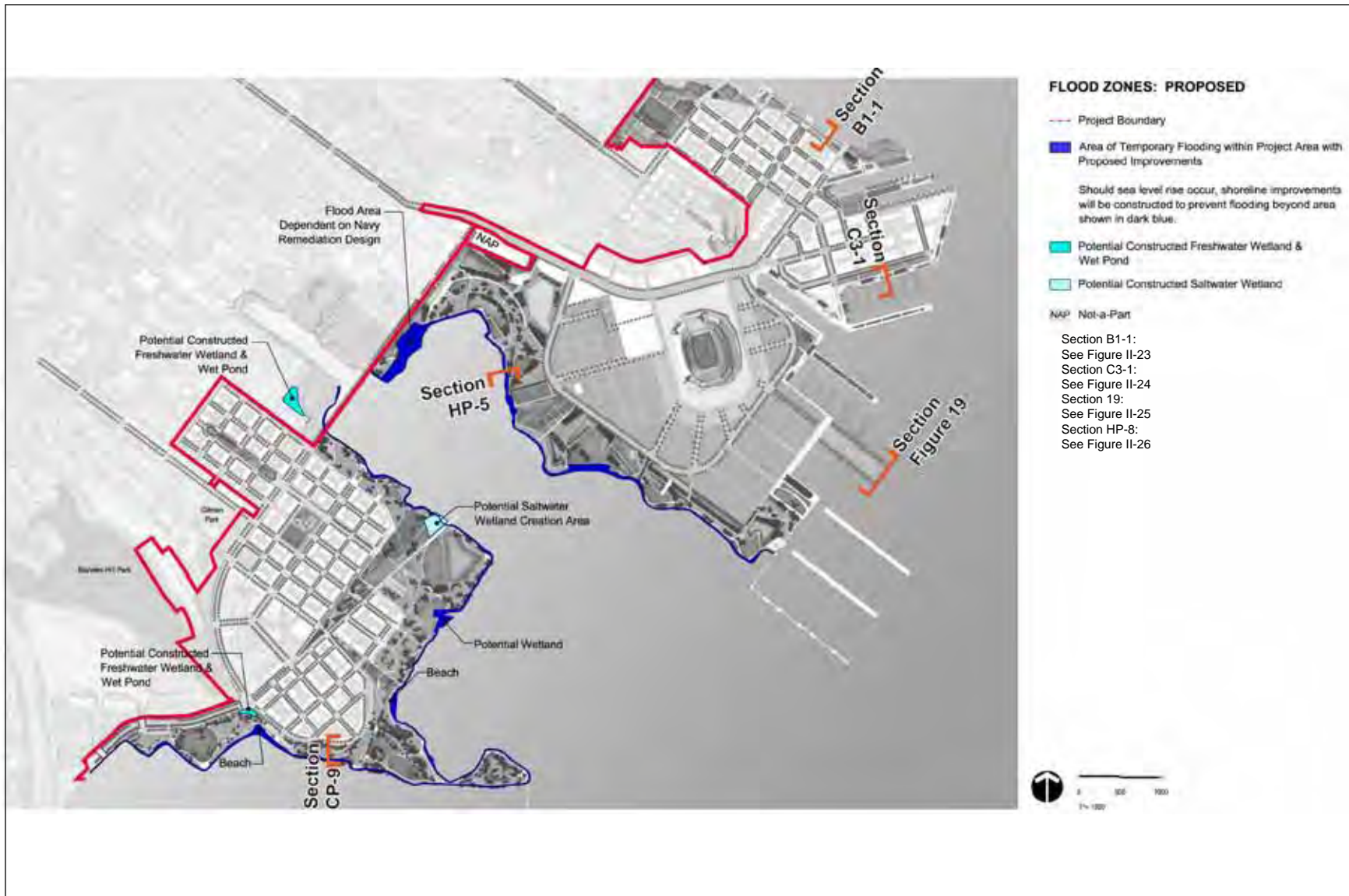
SOURCE: RHAA, 2009.

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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)**



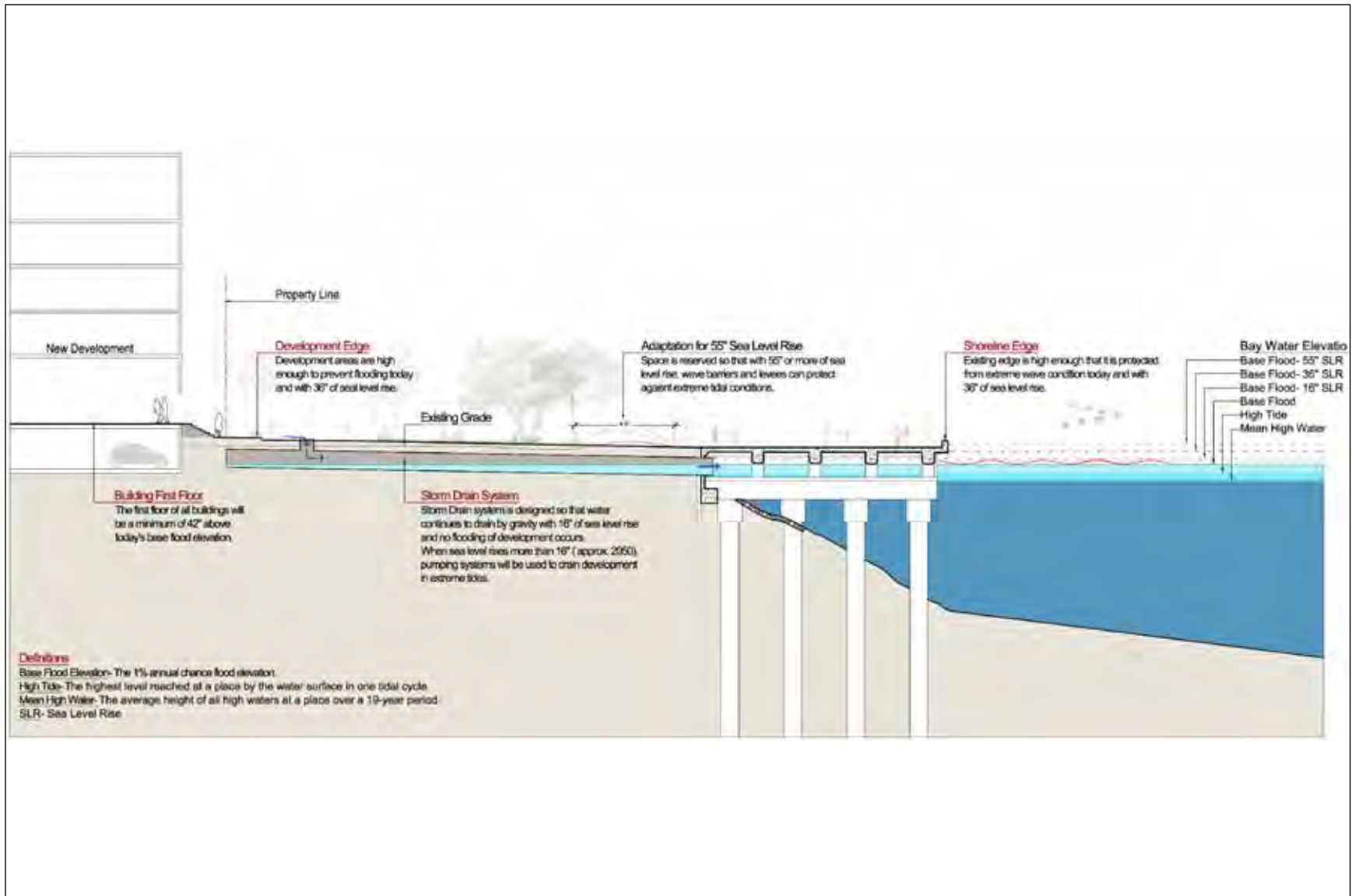
SOURCE: RHAA, 2009.

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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)**



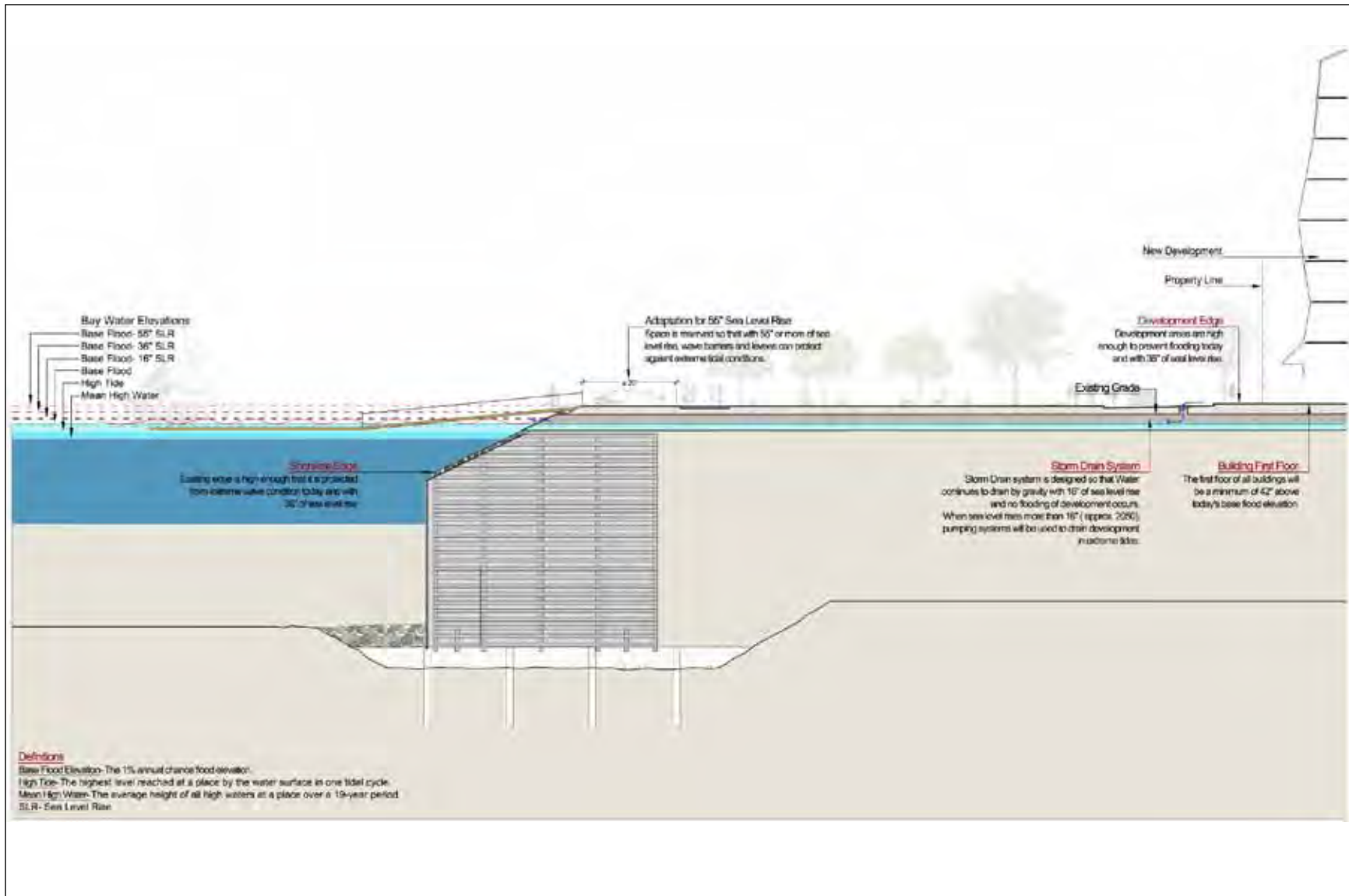
SOURCE: RHAA, 2009.

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FIGURE II-23



Candlestick Point — Hunters Point Shipyard Phase II EIR
HPS SHORELINE SECTION
(BERTHS 55 TO 60; WATERFRONT PROMENADE)



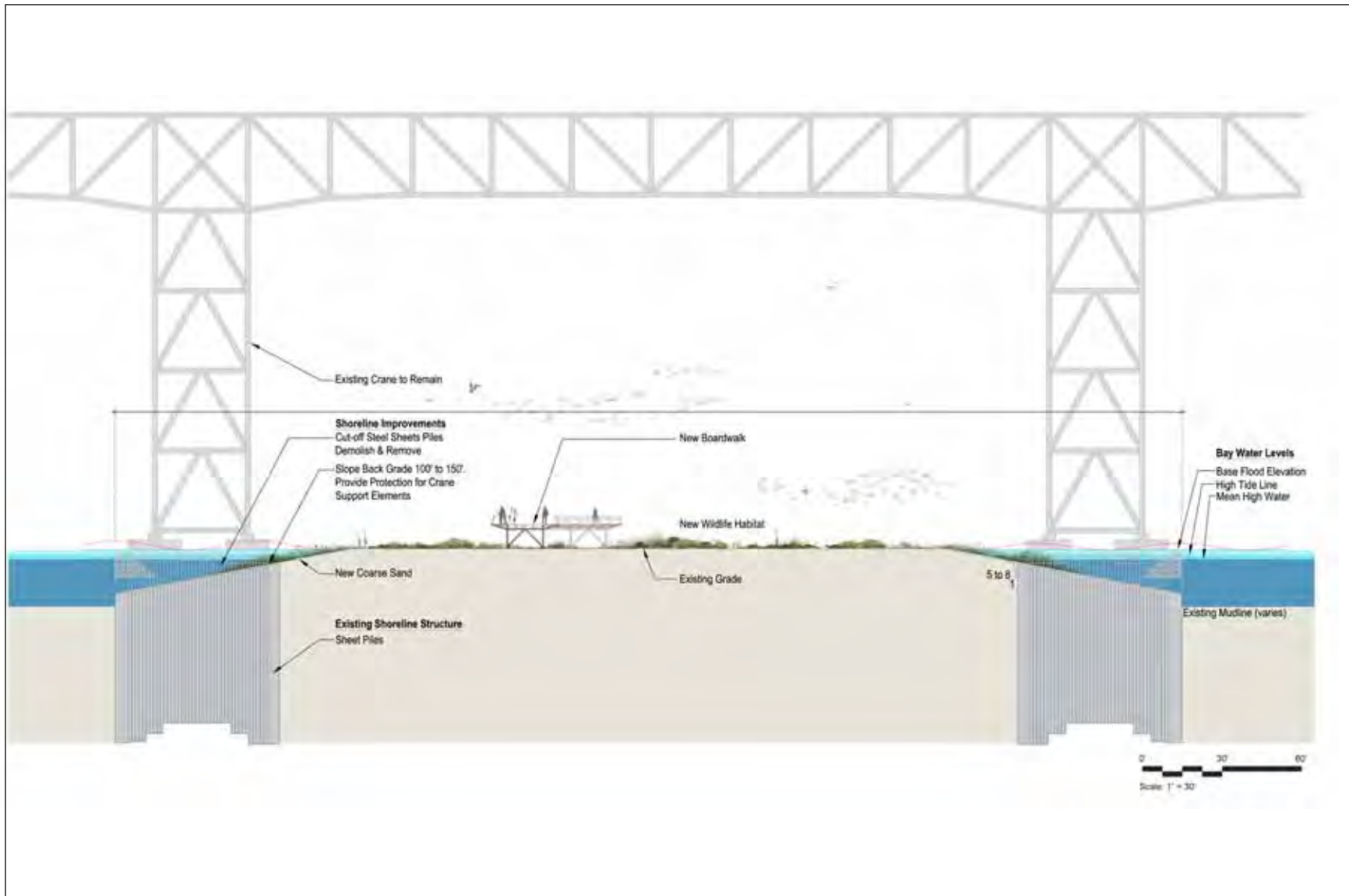
SOURCE: RHAA, 2009.

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FIGURE II-24



Candlestick Point — Hunters Point Shipyard Phase II EIR
HPS SHORELINE SECTION (BERTHS 3-5; MARINA)



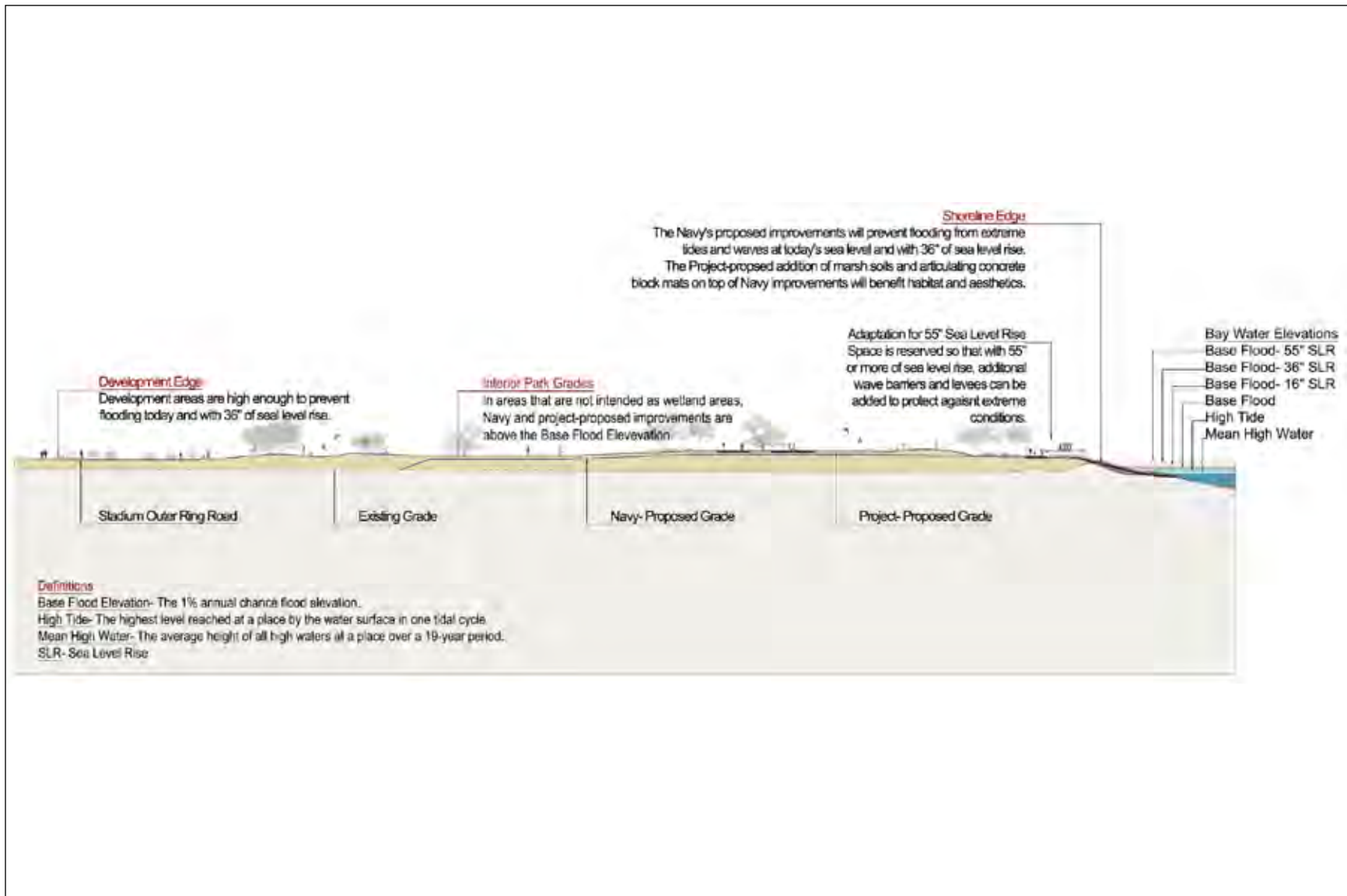
SOURCE: RHAA, 2009.

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)



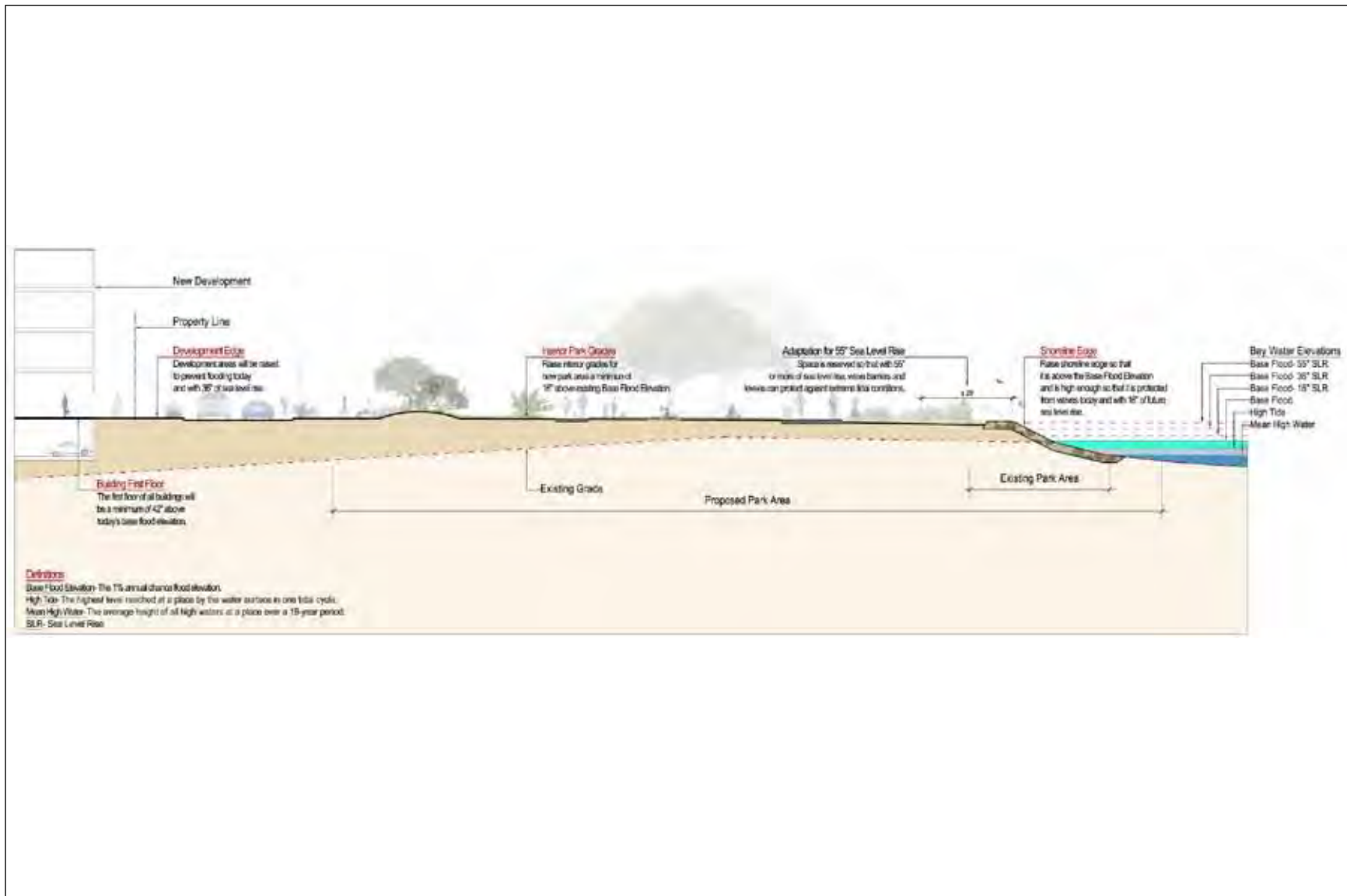
SOURCE: RHAA, 2009.

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FIGURE II-26



Candlestick Point — Hunters Point Shipyard Phase II EIR
HPS SHORELINE SECTION (GRASSLANDS ECOLOGY PARK)



SOURCE: RHAA, 2009.

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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				Subtotal	Total
		2019	2023	2027	2032		
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 during 2015, 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:

<i>Impact PH-2: Population Growth</i>
--

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]):

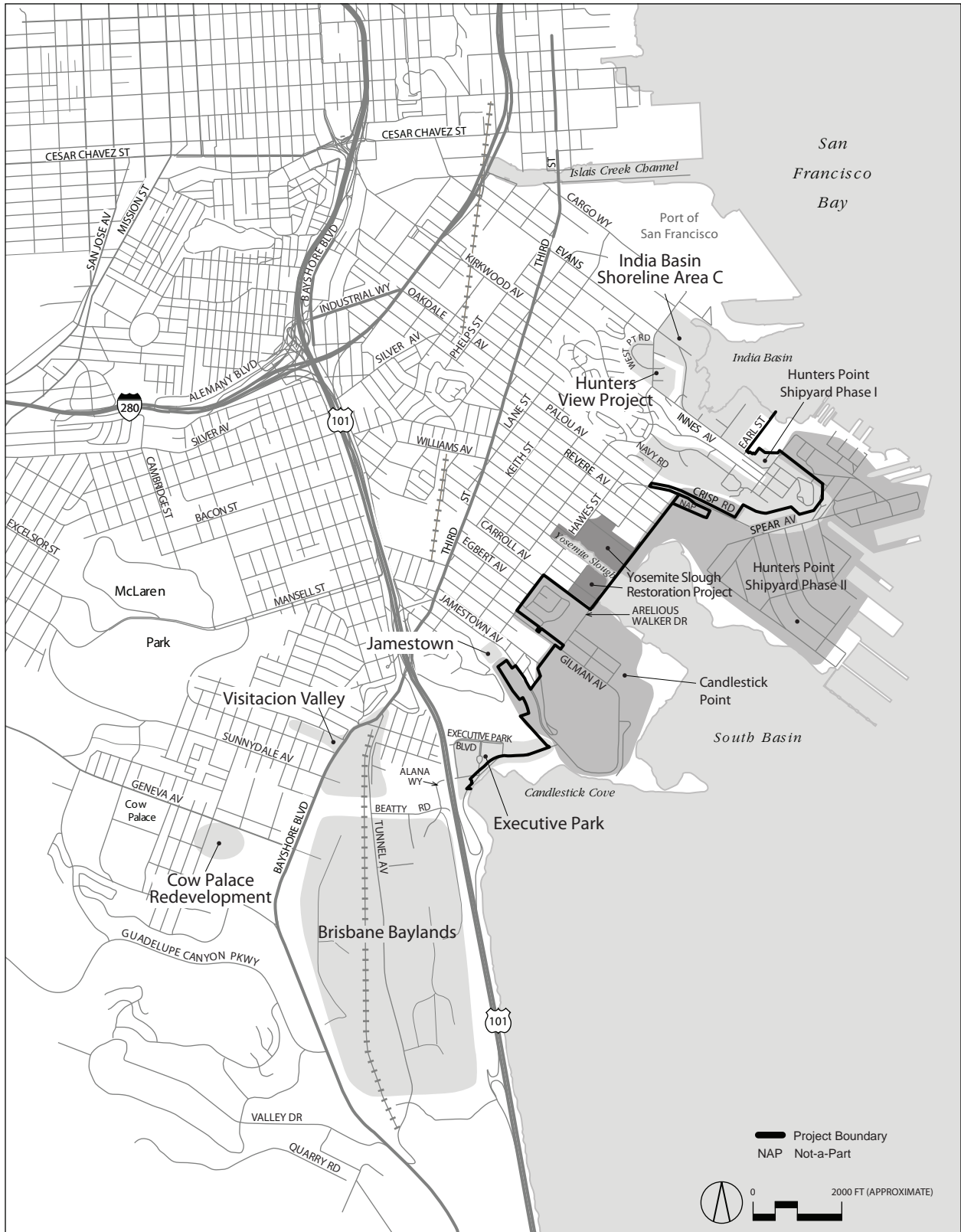
- India Baseline Shoreline
 - Hunters Point Shipyard Phase I
 - Hunters View
 - Jamestown
 - Executive Park
 - Brisbane Baylands
 - Cow Palace
 - Visitacion Valley/Schlage Lock
- A comprehensive list of all related projects included in background growth assumptions for the traffic, air quality, and noise 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
EXISTING LAND USE

FIGURE III.B-1

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 baseball⁴⁸ 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.

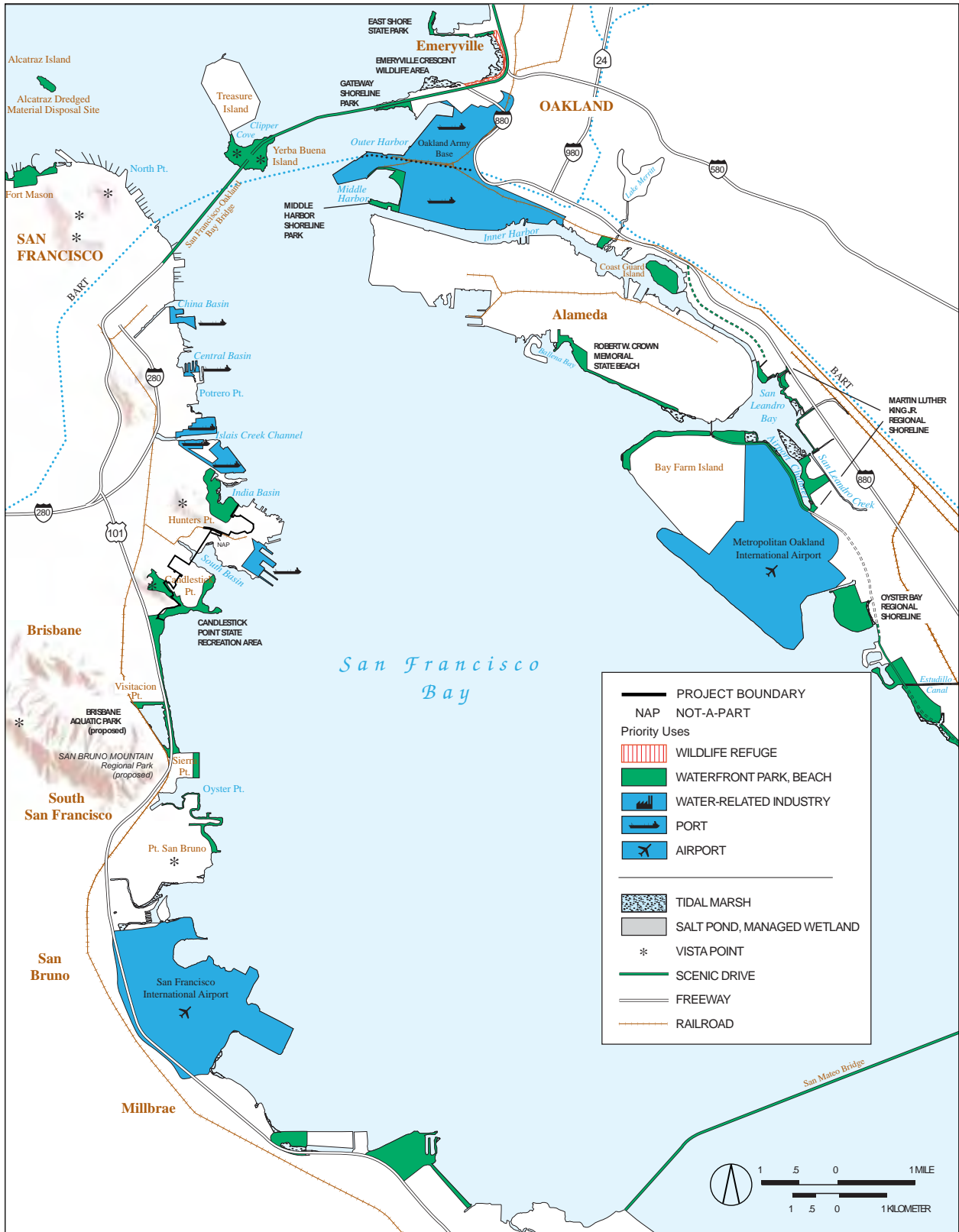
BCDC’s permit authority over the Bay itself, which is below the mean high tide line, relates primarily to Bay fill, which can be approved by the Commission only for certain water-oriented uses or for improving shoreline appearance or public access to the Bay, and when there is no alternative upland location 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

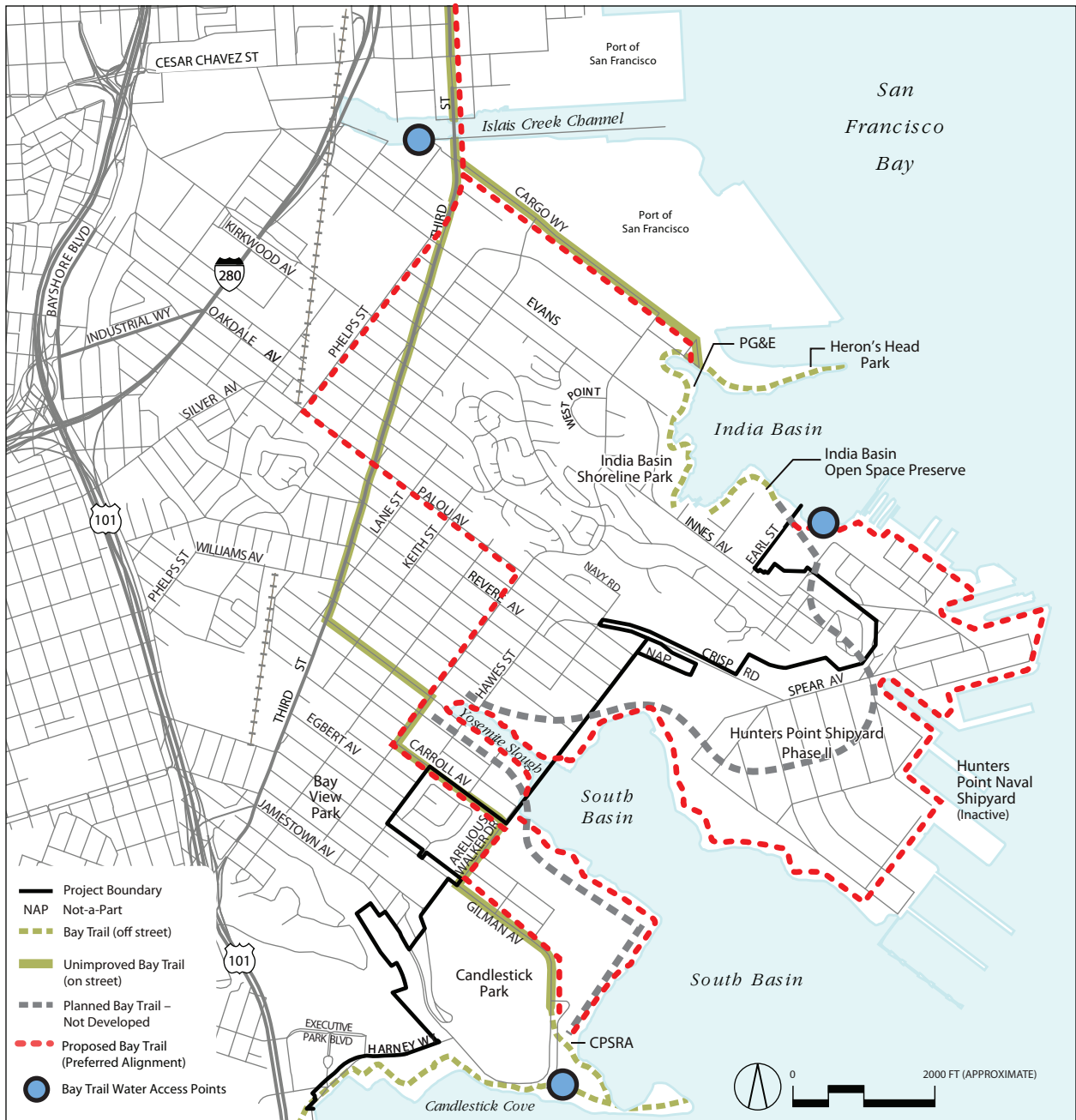
The Project would include the construction of the Bay Trail throughout the Project area, and support the proposed waterfront trail connection route within the Gap Analysis Study area, whereby the existing trail south of the Project area would ultimately connect to the existing northern trail along the 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).

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 CPRSRA 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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Candlestick Point — Hunters Point Shipyard Phase II EIR
BAYVIEW HUNTERS POINT REDEVELOPMENT PLAN
LAND USE DESIGNATIONS

FIGURE III.B-4

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.

- **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.

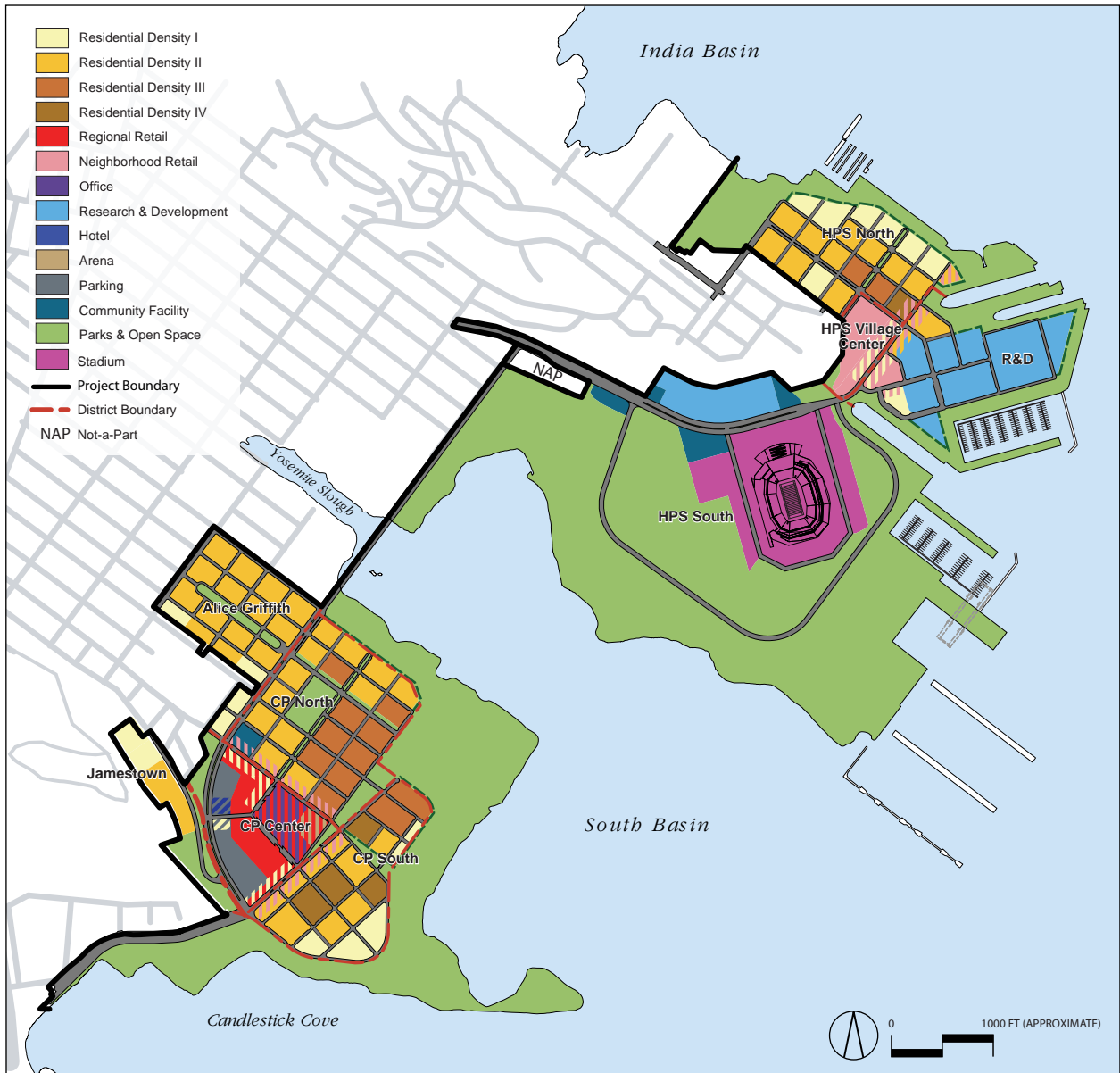
As discussed under Impact LU-2, the Project is consistent with the policies contained in the HPS Redevelopment Plan. The Project is not consistent with some of the Land Use Designations for the HPS Phase II site and standards and intensity of uses identified within the HPS Redevelopment Plan. The Project 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 be 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 STAR⁶¹ 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-modal 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.

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)			
<i>Analysis Area</i>	<i>Population</i>	<i>Households^a</i>	<i>Persons per Household^b</i>
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 population⁶⁵ 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	
<i>Income Group</i>	<i>Number of Units</i>
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)	
<i>Analysis Area</i>	<i>Total</i>
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						
<i>Land Use</i>	<i>Employment Factor^a</i>	<i>Development Program, Candlestick Point^b</i>	<i>Employment, Candlestick Point (jobs)</i>	<i>Development Program, HPS Phase II^b</i>	<i>Employment, HPS Phase II (jobs)</i>	<i>Total Employment (jobs)</i>
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						
<i>Year</i>	<i>Candlestick Point</i>		<i>HPS Phase II</i>		<i>Combined</i>	
	<i>Max. Number of Daily Workers</i>	<i>Avg. Number of Daily Workers</i>	<i>Max. Number of Daily Workers</i>	<i>Avg. Number of Daily Workers</i>	<i>Max. Number of Daily Workers</i>	<i>Avg. Number of Daily Workers</i>
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 projections⁸⁴ 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

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.

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 projections⁹⁵ 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.

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.

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-380¹⁰⁶ 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 Avenue¹⁰⁷ 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/Aleman/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.

LOS	Maximum Density (Passenger Cars per Mile per Lane)		Service Volume (Passenger Cars per Hour)		
	Basic Freeway Sections	Freeway Weaving Segments and Ramp Junctions	Freeway Weaving Sections (Lanes)		
			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 point¹⁰⁸, 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.

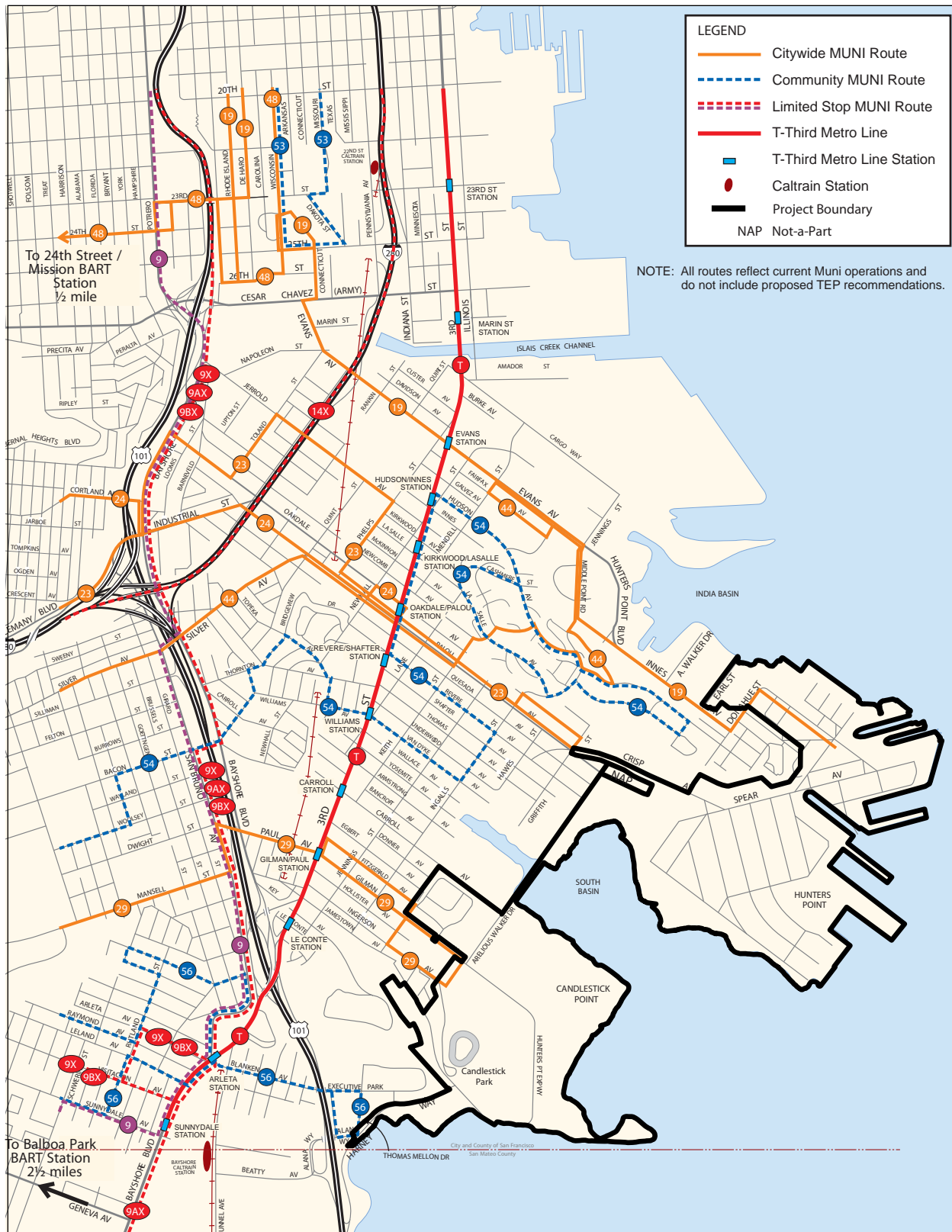
Transit

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			
Route	Frequency of Service (average time in minutes)		
	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.

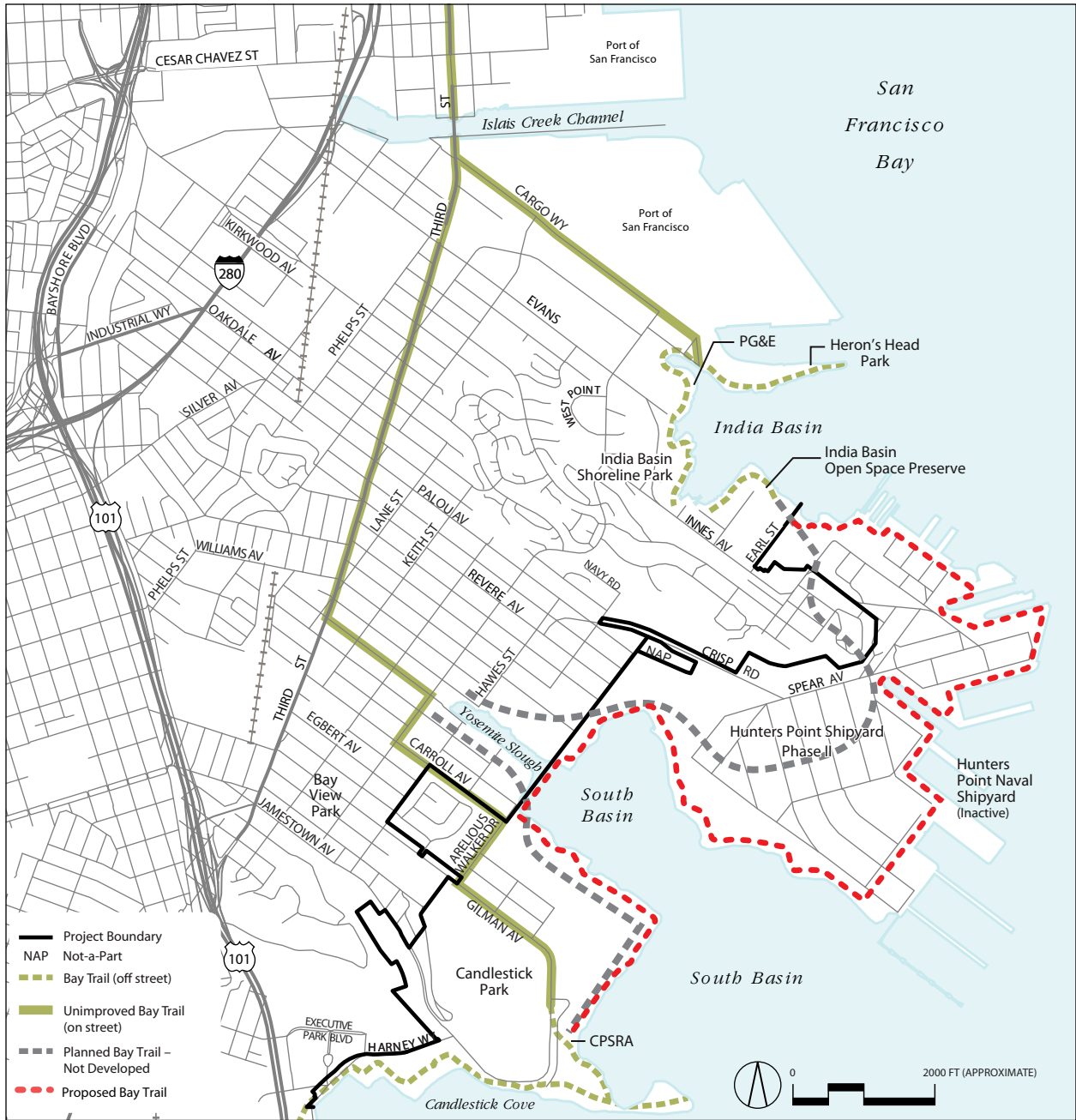


SOURCE: Fehr & Peers, 2009.

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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

- ① The San Francisco Bay Plan was prepared by the San Francisco Bay Conservation and Development Commission (BCDC) pursuant to the McAttee-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 $\frac{1}{2}$ 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.

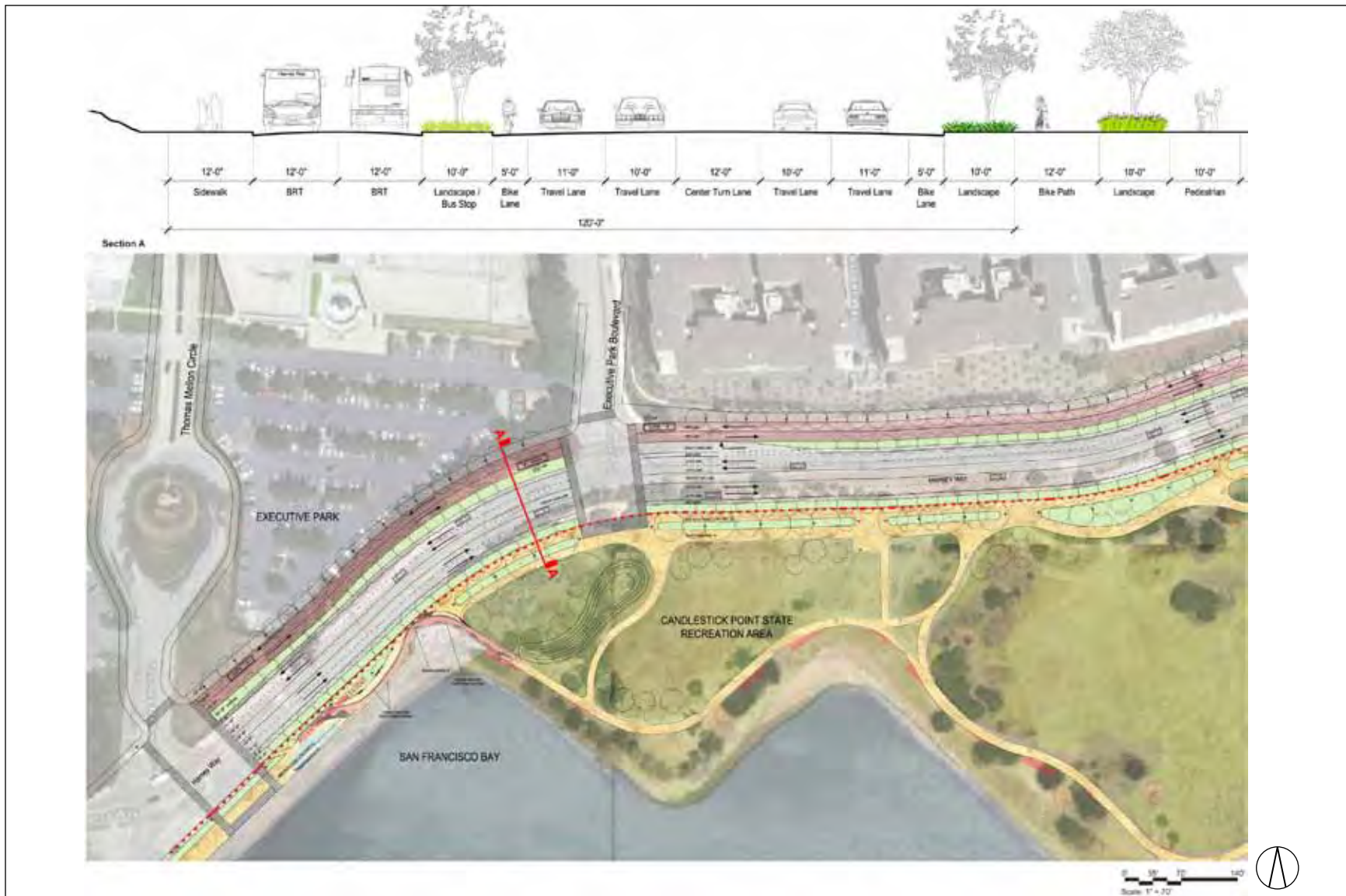
4. Transportation Improvements Proposed as Part of the Project

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: 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.

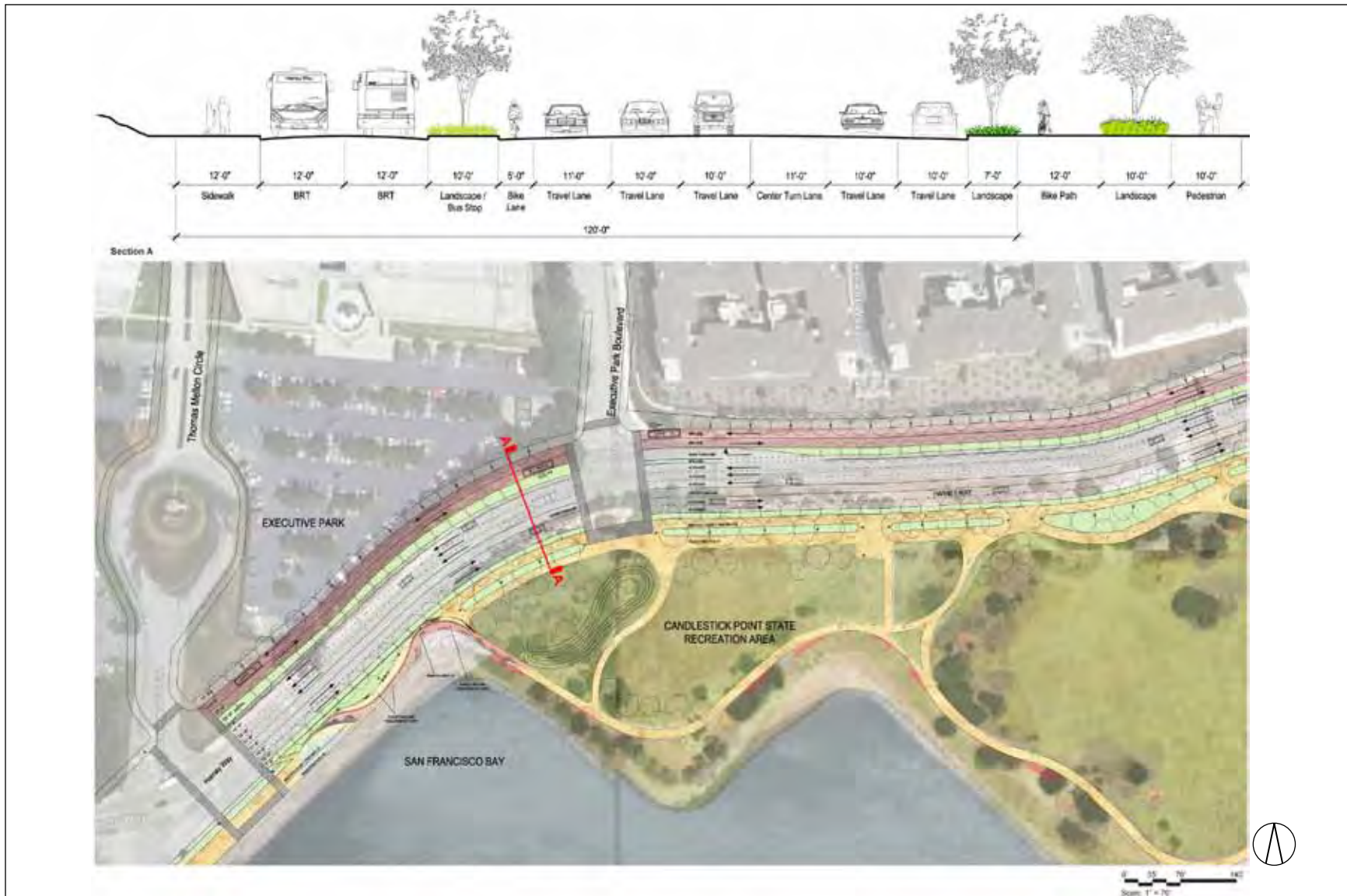
Streets would be designed as complete streets consistent with the Better Streets Plan (Draft for Public Review, June 2008) to enable safe access for all users¹¹⁶. Proposed techniques would include driveway access management; traffic calming features such as signage and striping, pedestrian bulbouts where 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.

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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 treatment¹¹⁷ 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'Shaughnessy 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

Candlestick Point — Hunters Point Shipyard Phase II EIR
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

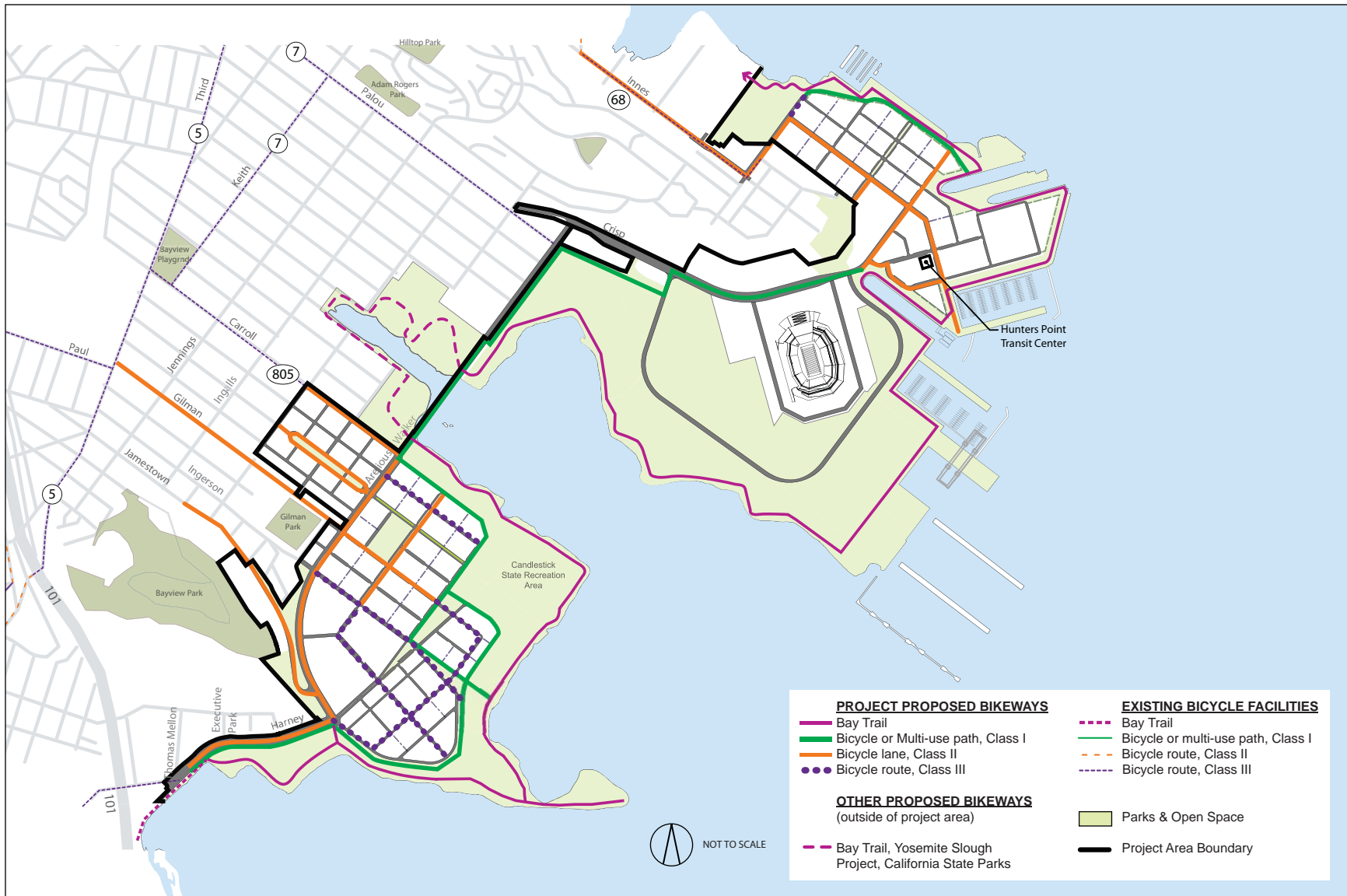
The pedestrian network would encourage walking as a primary mode of transportation within the Project site, and with separated pedestrian pathways, between Hunters Point and Candlestick Point on the Yosemite Slough bridge. Sidewalk and multi-use pathways would allow access to transit facilities and to 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:



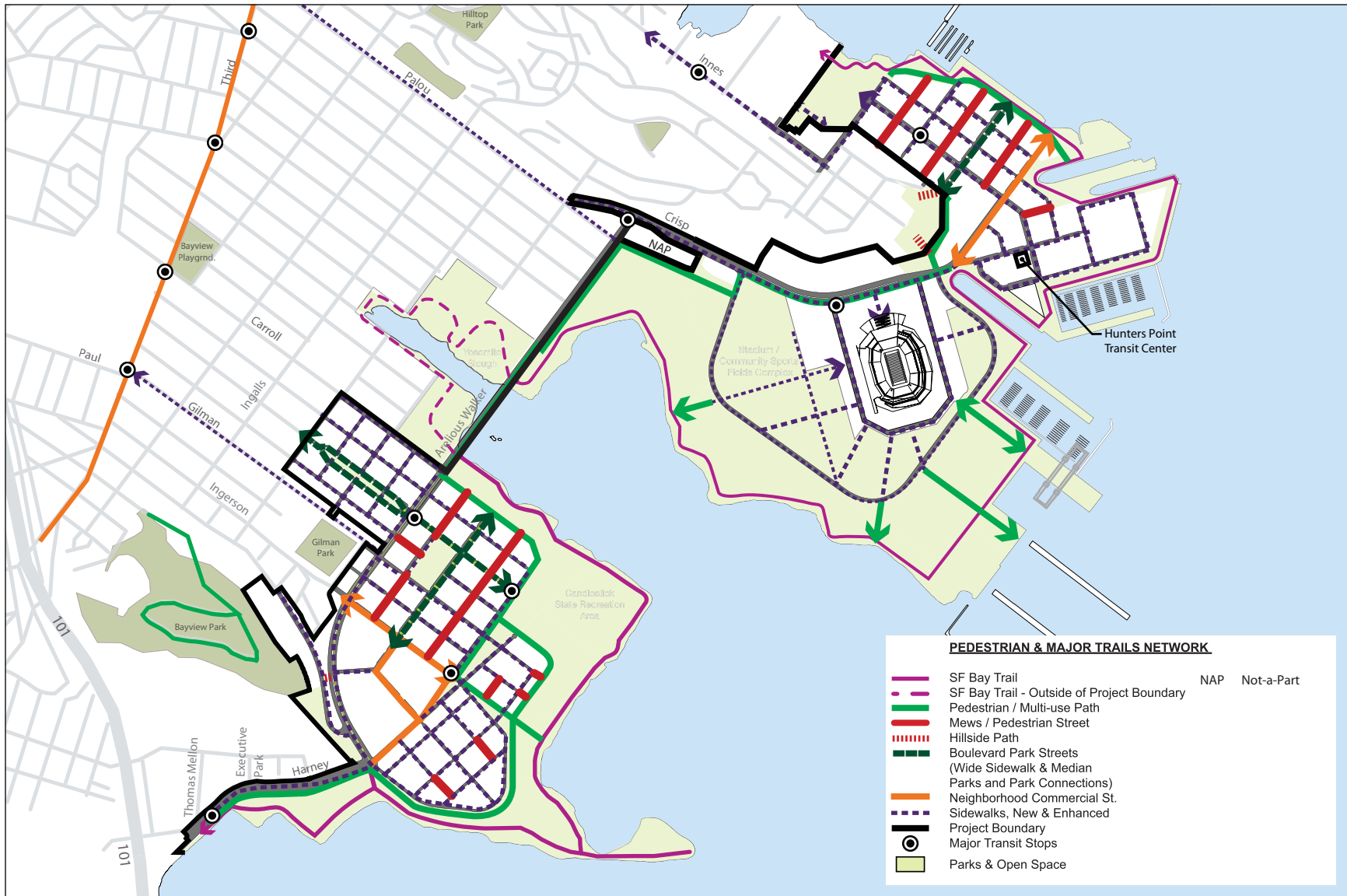
SOURCE: Fehr & Peers, 2010.

PBS&J 04.16.10 02056 | JCS | 10

FIGURE III.D-10



Candlestick Point — Hunters Point Shipyard Phase II EIR
PROJECT BICYCLE NETWORK AND BAY TRAIL IMPROVEMENTS



SOURCE: Fehr & Peers, 2009.

PBS&J 10.30.09 08068 | JCS | 09

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						
	<i>Person Trips</i>					<i>Vehicle Trips</i>
	<i>Auto</i>	<i>Transit</i>	<i>Bicycle</i>	<i>Internal/Linked</i>	<i>Total</i>	
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%
<i>Total San Francisco</i>	<i>82%</i>	<i>75%</i>	<i>79%</i>	<i>52%</i>	<i>54%</i>	<i>53%</i>
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%
<i>Total San Francisco</i>	<i>83%</i>	<i>77%</i>	<i>80%</i>	<i>47%</i>	<i>58%</i>	<i>53%</i>
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			
	<i>Attendees by Mode</i>	<i>Vehicle Trips</i>	<i>Transit Trips</i>
Spectators			
Auto	49,162	18,135	—
Charter Bus	3,656	—	3,656
Transit	12,732	—	12,732
<i>Subtotal</i>	<i>65,550</i>	<i>18,135</i>	<i>16,388</i>
Employees/Media			
Auto	2,683	2,000	—
Transit	653	—	653
<i>Subtotal</i>	<i>3,336</i>	<i>2,000</i>	<i>653</i>
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				
Project Area	Residential		Non-Residential	
	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 1/2 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				
<i>Route</i>	<i>Project Requirement</i>		<i>2030 No Project Needs</i>	
	<i>AM</i>	<i>PM</i>	<i>AM</i>	<i>PM</i>
9-San Bruno	1	1	5	7
23-Monterey	0	0	1	1
24-Divisadero	2	2	1	0
28L-19 th Avenue/Geneva Limited	1	1	1	1
29-Sunset	2	4	1	0
44-O’Shaughnessy	1	3	3	4
48-Quintara-24 th 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 these 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 yet¹²³ 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							
<i>Intersection</i>		<i>Existing</i>		<i>2030 No Project</i>		<i>2030 Project</i>	
		<i>Delay^a</i>	<i>LOS^b</i>	<i>Delay</i>	<i>LOS</i>	<i>Delay</i>	<i>LOS</i>
1	Third St/25 th 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							
<i>Intersection</i>	<i>Existing</i>		<i>2030 No Project</i>		<i>2030 Project</i>		
	<i>Delay^a</i>	<i>LOS^b</i>	<i>Delay</i>	<i>LOS</i>	<i>Delay</i>	<i>LOS</i>	
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/Alemanly/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							
<i>Intersection</i>		<i>Existing</i>		<i>2030 No Project</i>		<i>2030 Project</i>	
		<i>Delay</i> ^a	<i>LOS</i> ^b	<i>Delay</i>	<i>LOS</i>	<i>Delay</i>	<i>LOS</i>
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

	Intersection	Existing		2030 No Project		2030 Project	
		Delay ^a	LOS ^b	Delay	LOS	Delay	LOS
1	Third St/25 th 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	25 th St/Illinois St	7	A	14	B	14	B
14	25 th 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

	Intersection	Existing		2030 No Project		2030 Project	
		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

<i>Intersection</i>		<i>Existing</i>		<i>2030 No Project</i>		<i>2030 Project</i>	
		<i>Delay^a</i>	<i>LOS^b</i>	<i>Delay</i>	<i>LOS</i>	<i>Delay</i>	<i>LOS</i>
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

Intersection	Existing		2030 No Project		2030 Project	
	Delay ^a	LOS ^b	Delay	LOS	Delay	LOS
1 Third St/25 th 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 25 th St/Illinois St	7	A	10	A	10	A
14 25 th 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

Intersection	Existing		2030 No Project		2030 Project	
	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/Aleman/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

Intersection	Existing		2030 No Project		2030 Project	
	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 Visitation 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/Aleman 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 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 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						
<i>Mainline Segment</i>	<i>LOS</i>	<i>Density^a (pc/mi/ln)</i>	<i>LOS</i>	<i>Density (pc/mi/ln)</i>	<i>LOS</i>	<i>Density (pc/mi/ln)</i>
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
<i>Weaving Segment</i>	<i>LOS</i>	<i>Service Vol. (pc/l)</i>	<i>LOS</i>	<i>Service Vol. (pc/l)</i>	<i>LOS</i>	<i>Service Vol. (pc/l)</i>
I-280						
NB—25 th Street to Mariposa Street	E	1,680	F	>1,900	F	>1,900
SB—Mariposa Street to 25 th Street	B	810	E	1,710	E	1,710
WEEKDAY PM PEAK HOUR						
<i>Mainline Segment</i>	<i>LOS</i>	<i>Density^a (pc/mi/ln)</i>	<i>LOS</i>	<i>Density (pc/mi/ln)</i>	<i>LOS</i>	<i>Density (pc/mi/ln)</i>
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						
	<i>Existing</i>		<i>2030 No Project</i>		<i>2030 Project</i>	
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—25 th Street to Mariposa Street	C	1,350	F	>1,900	F	>1,900
SB—Mariposa Street to 25 th Street	E	1,630	F	>1,900	F	>1,900
SUNDAY PM PEAK HOUR						
<i>Mainline Segment</i>	<i>LOS</i>	<i>Density^a (pc/mi/ln)</i>	<i>LOS</i>	<i>Density (pc/mi/ln)</i>	<i>LOS</i>	<i>Density (pc/mi/ln)</i>
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—25 th Street to Mariposa Street	A	—	C	1,200	C	1,220
SB—Mariposa Street to 25 th 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/25 th	D	33.4	F	>45	F	>45
SB off to Pennsylvania/25 th	C	23.6	E	37.0	E	36.9
SB on from Pennsylvania/25 th	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

Ramp Location	Existing		2030 No Project		2030 Project	
	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/25 th	C	27.4	F	>45	F	>45
SB off to Pennsylvania/25 th	E	36.7	F	>45	F	>45
SB on from Pennsylvania/25 th	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

Ramp Location	Existing		2030 No Project		2030 Project	
	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/25 th	B	18.4	C	25.6	D	25.8
SB off to Pennsylvania/25 th	C	27.0	D	30.7	D	30.9
SB on from Pennsylvania/25 th	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

Ramp Location	Ramp Storage	Existing	2030 No Project	Project
		95th % Queue ^a	95th % Queue	95th % Queue
WEEKDAY AM PEAK HOUR				
US-101				
NB off to Harney Way ²	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/Geneva ²	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/25 th	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

Ramp Location	Ramp Storage	Existing	2030 No Project	Project
		95th % Queue ^a	95th % Queue	95th % Queue
I-280				
NB off to Cesar Chavez	2,500	650	900	900
SB on from Pennsylvania/25 th	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/25 th	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 Bayside 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 Bayside 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

<i>Cordon</i>	<i>Existing Capacity^a</i>	<i>2030 No Project TEP Capacity^b</i>	<i>2030 Project Capacity^c</i>
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

<i>Intersection</i>	<i>Existing</i>		<i>2030 No Project</i>		<i>Project</i>	
	<i>Ridership</i>	<i>Capacity Utilization</i>	<i>Ridership</i>	<i>Capacity Utilization</i>	<i>Ridership</i>	<i>% Utilized</i>
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

Intersection	Existing		2030 No Project		Project	
	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						
<i>Intersection</i>	<i>Existing</i>		<i>2030 No Project</i>		<i>Project</i>	
	<i>Ridership</i>	<i>Capacity Utilization</i>	<i>Ridership</i>	<i>Capacity Utilization</i>	<i>Ridership</i>	<i>%Util.</i>
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**

Intersection	Existing		2030 No Project		Project	
	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%
<i>Subtotal</i>	<i>20,401</i>	<i>108%</i>	<i>41,520</i>	<i>151%</i>	<i>41,520</i>	<i>151%</i>
North Bay						
Golden Gate Transit	1,510	57%	2,623	106%	2,621	106%
Ferries	949	56%	1,647	97%	1,647	97%
<i>Subtotal</i>	<i>2,459</i>	<i>56%</i>	<i>4,268</i>	<i>102%</i>	<i>4,268</i>	<i>102%</i>
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%
<i>Subtotal</i>	<i>13,999</i>	<i>94%</i>	<i>17,809</i>	<i>82%</i>	<i>17,818</i>	<i>82%</i>
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%
<i>Subtotal</i>	<i>20,204</i>	<i>102%</i>	<i>36,873</i>	<i>128%</i>	<i>36,900</i>	<i>128%</i>
North Bay						
Golden Gate Transit	1,397	63%	2,513	114%	2,513	114%
Ferries	906	53%	1,630	96%	1,630	96%
<i>Subtotal</i>	<i>2,303</i>	<i>59%</i>	<i>4,143</i>	<i>106%</i>	<i>4,143</i>	<i>106%</i>
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%
<i>Subtotal</i>	<i>12,106</i>	<i>83%</i>	<i>15,027</i>	<i>69%</i>	<i>15,194</i>	<i>70%</i>
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’Shaughnessy

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-Divisadero and the 44-O’Shaughnessy. To address Project impacts to the 23-Monterey, 24-Divisadero 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-Divisadero 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 Baysshore/Cortland, Baysshore/Industrial, and Baysshore/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.*

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 1/2 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* *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 Baysshore 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 Baysshore 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 Baysshore 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 Baysshore 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

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.

- 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.

Project Area	Demand			Supply ^a			
	Residential	Non-Residential		Total Demand	Maximum Permitted Off Street ^b	New On Street	Total
	Long Term	Long Term	Short Term				
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.

Scenario/Project Area	Total Demand	Minimum Supply		Maximum Supply	
		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.

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



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.

<i>Exit Route</i>	<i>No Project (Existing Stadium)</i>	<i>Project (HPS Stadium)</i>
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 rooster 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

Candlestick Point — Hunters Point Shipyard Phase II EIR
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-19 th 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 (Baysshore 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

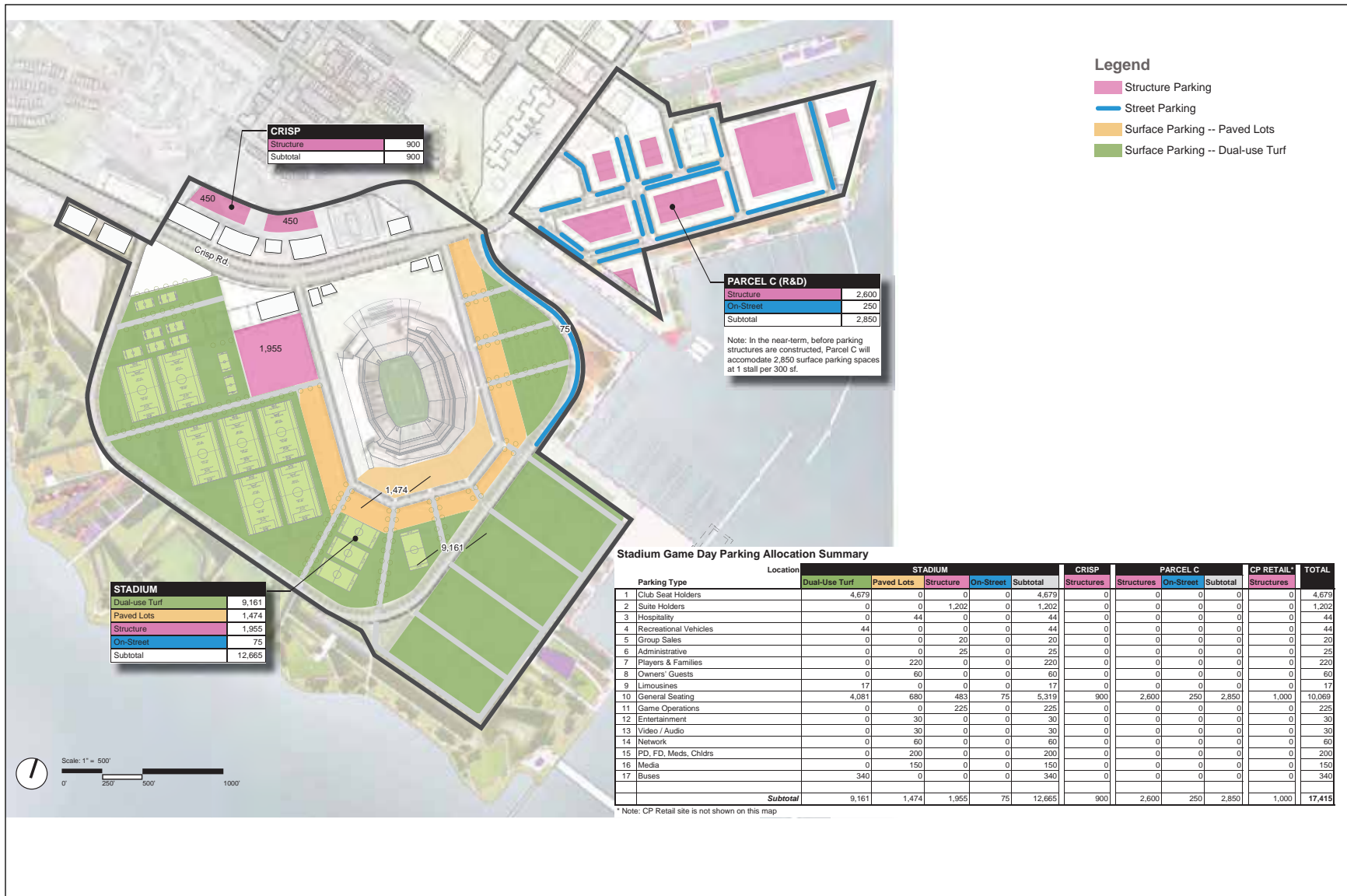
Impact TR-43 For as many of 12 times per year during game days, parking demand associated with sell-out events would exceed the proposed on-site supply, resulting in a parking supply shortfall. The shortfall would be accommodated within other on-street and off-street parking facilities, and some patrons 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.



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

Intersection	Project No Event		Project with Secondary Event	
	Delay ^a	LOS ^b	Delay	LOS
1 Third St/25 th 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 25 th 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-19 th 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’Shaughnessy, 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 (Bayside 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					
Intersection		Project No Event		Project with Arena Event	
		Delay^a	LOS^b	Delay	LOS
1	Third St/25 th 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		
<i>Route</i>	<i>Peak Hour Frequency (minutes)</i>	<i>One-Way Hourly Capacity (passengers per hour)</i>
29-Sunset	5	768
28L-19 th 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 that 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.

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](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.

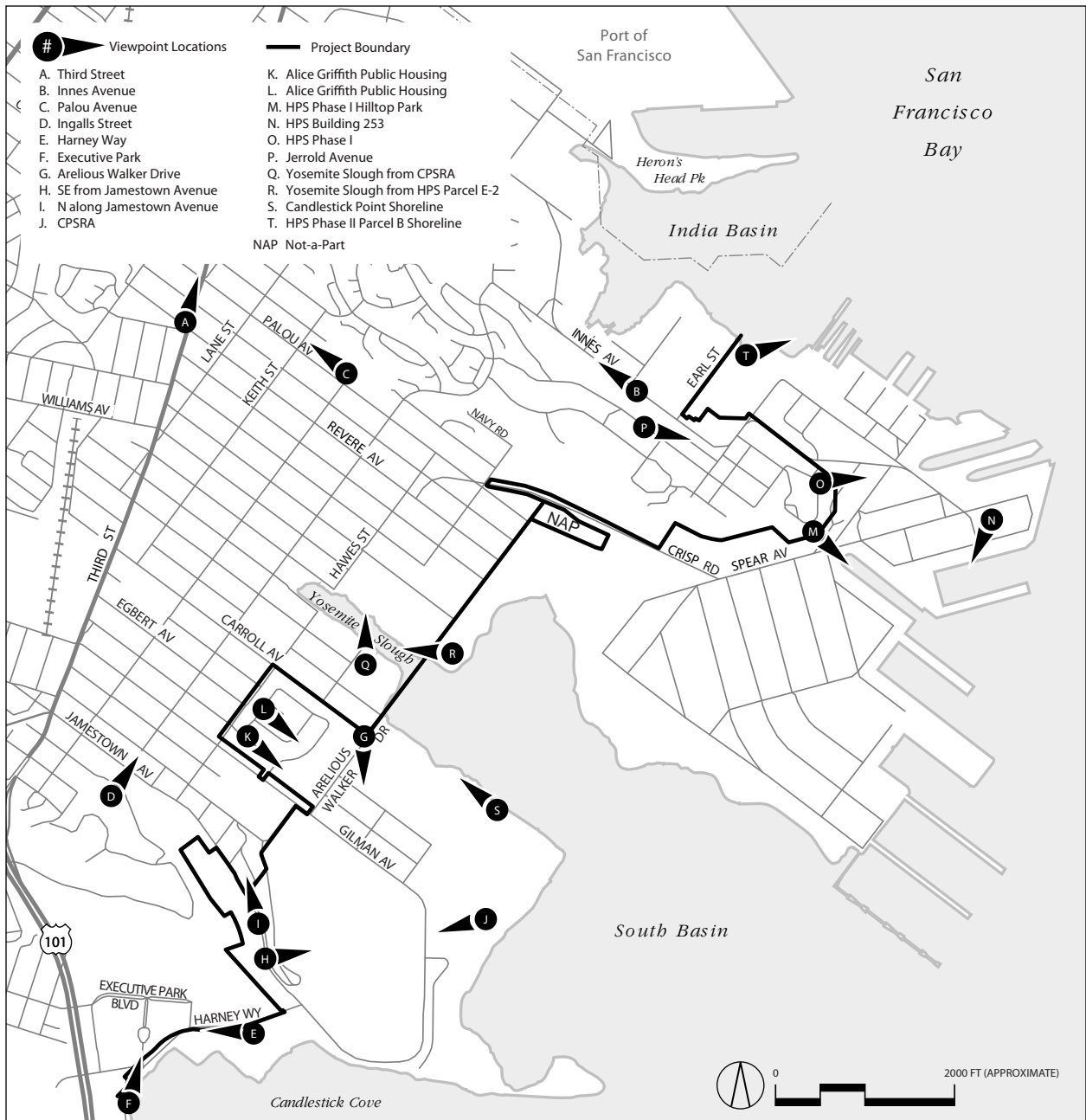
Photographs show existing views of the Project site and of existing conditions of neighborhoods in the Project vicinity. Figure III.E-1 through Figure III.E-9 include a viewpoint location key map and photographs of Project site conditions and of nearby neighborhoods. Figure III.E-10 through Figure III.E-30 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.

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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.

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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.

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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)

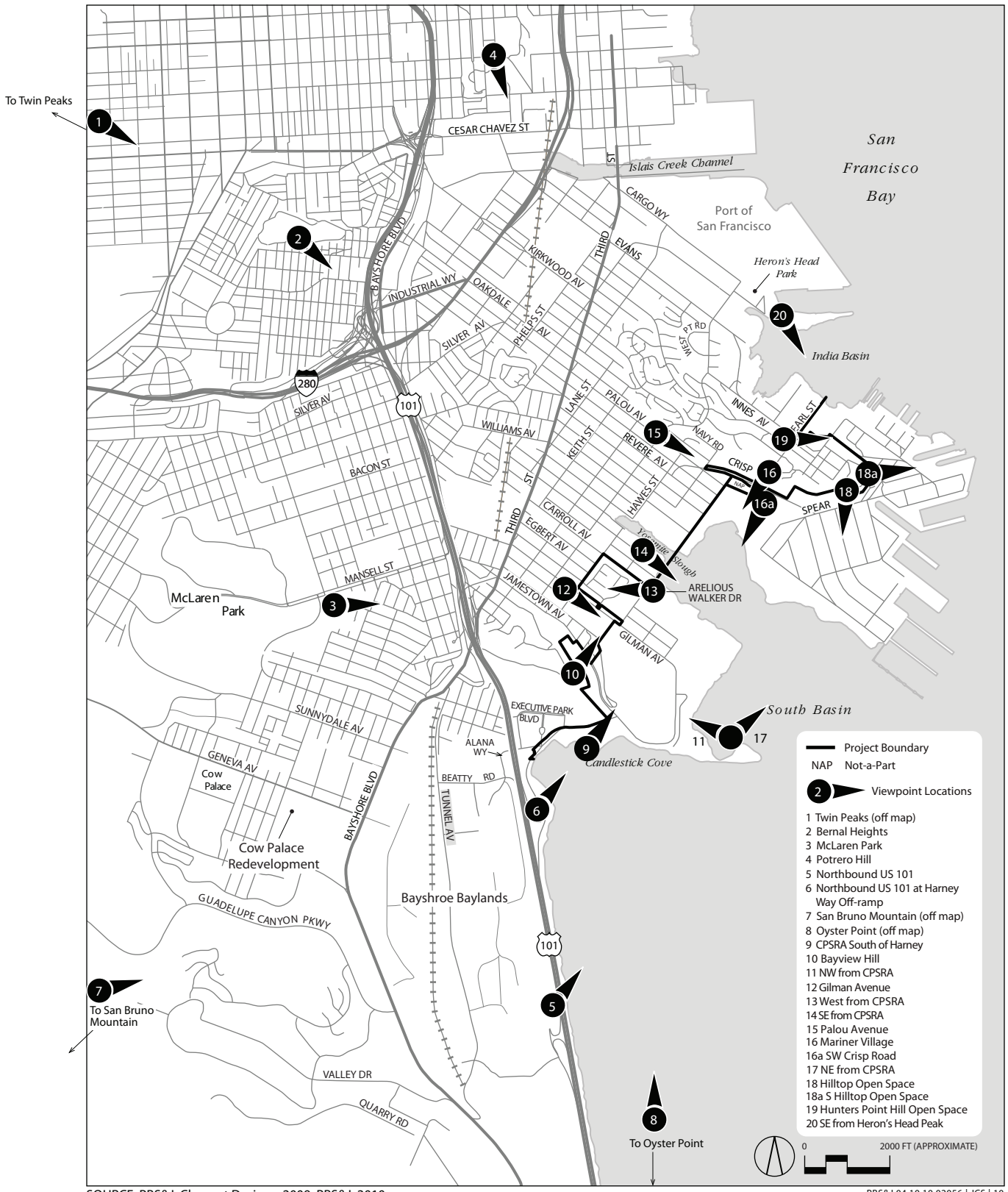
This viewpoint provides a view south across the southern portion of HPS, from open space that would be completed as part of HPS Phase I. Close-range views consist of abandoned storage and maintenance facilities that range from one to five stories in height. The Re-gunning crane is prominently visible 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.



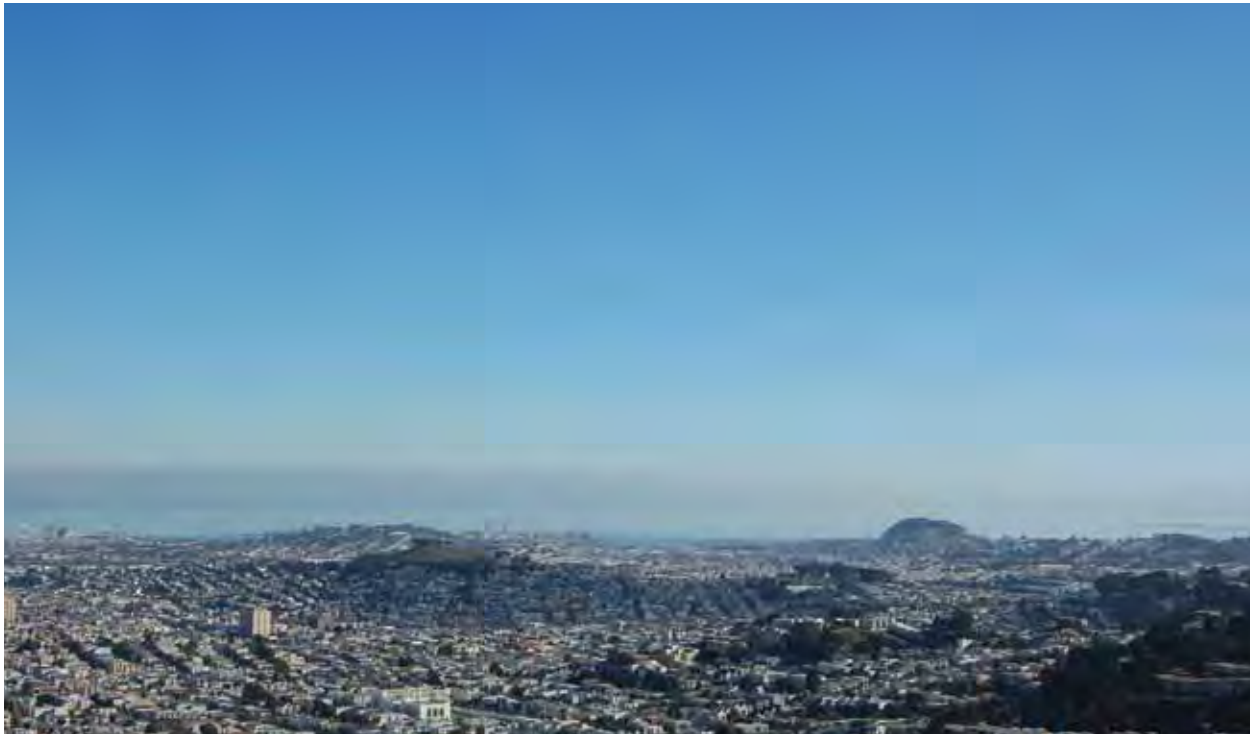
SOURCE: PBS&J, Clement Designs, 2009; PBS&J, 2010.

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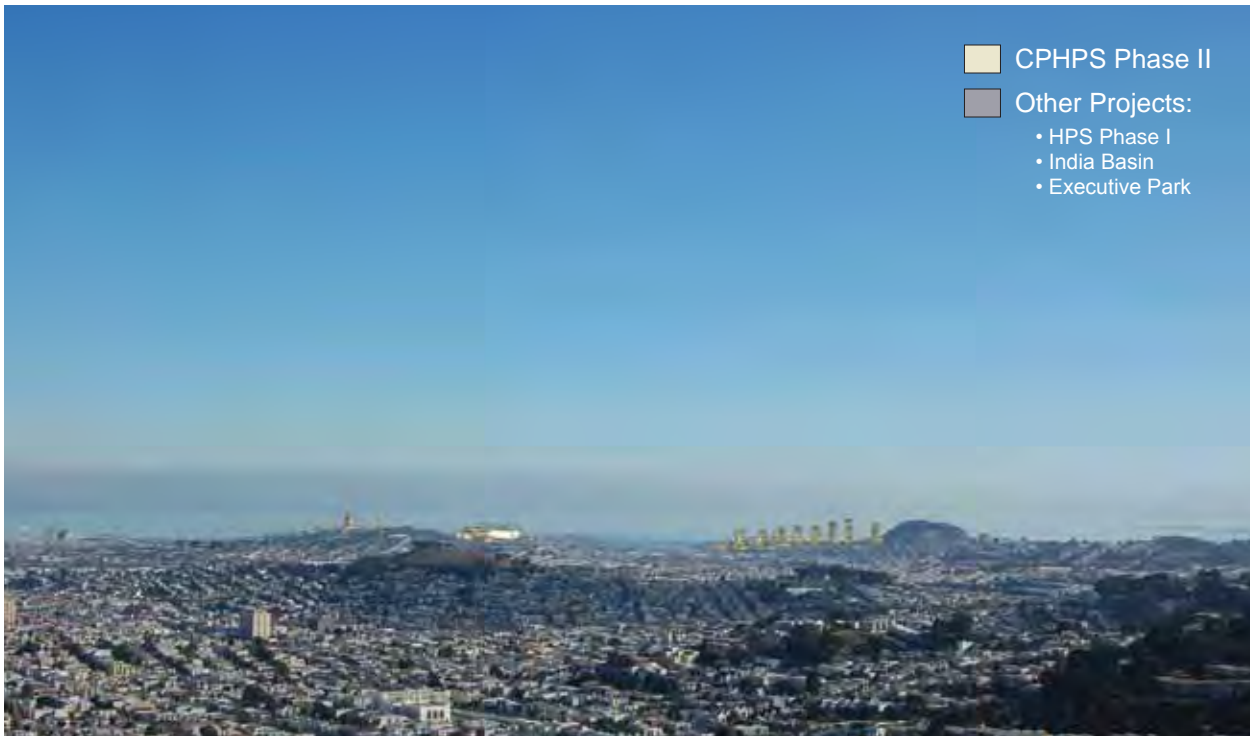
FIGURE III.E-10



**Candlestick Point — Hunters Point Shipyard Phase II EIR
 VIEWPOINT LOCATIONS**



Existing



Proposed

SOURCE: Lennar Urban, 2009.

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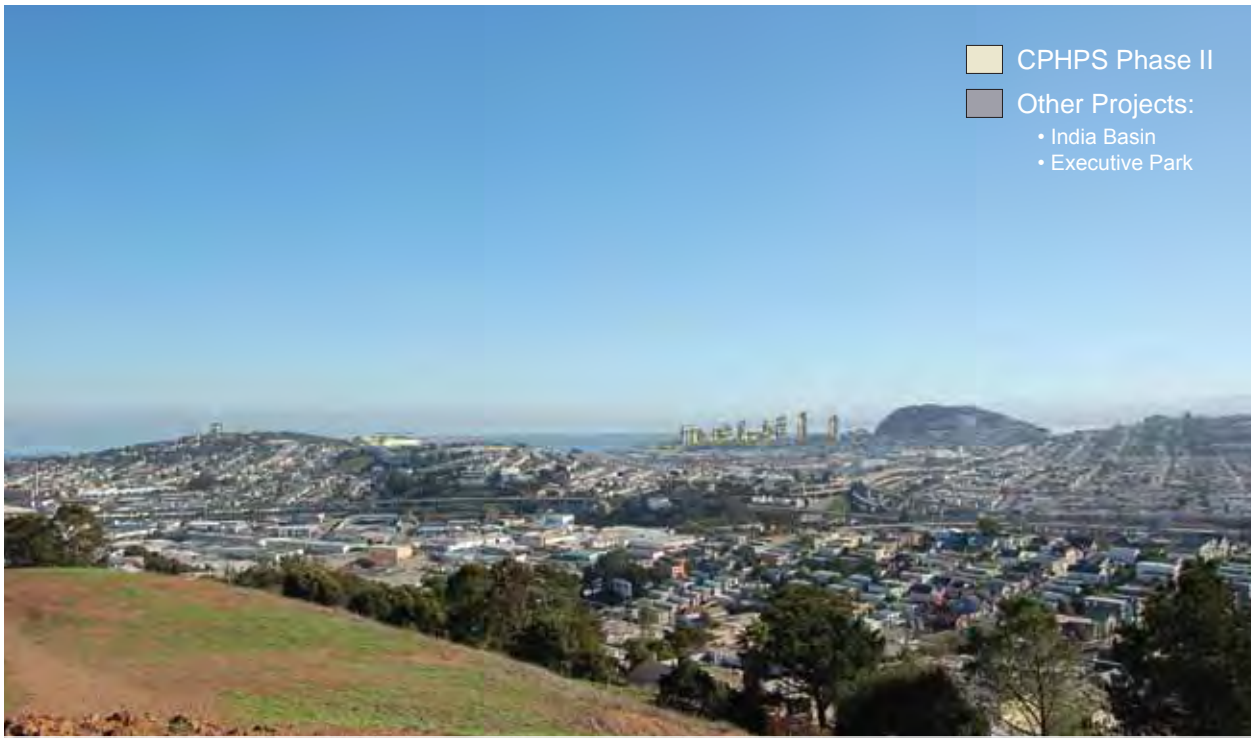
FIGURE III.E-11



Candlestick Point — Hunters Point Shipyard Phase II EIR
VIEW 1: SOUTHEAST FROM TWIN PEAKS



Existing



- CPHPS Phase II
- Other Projects:
 - India Basin
 - Executive Park

Proposed

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

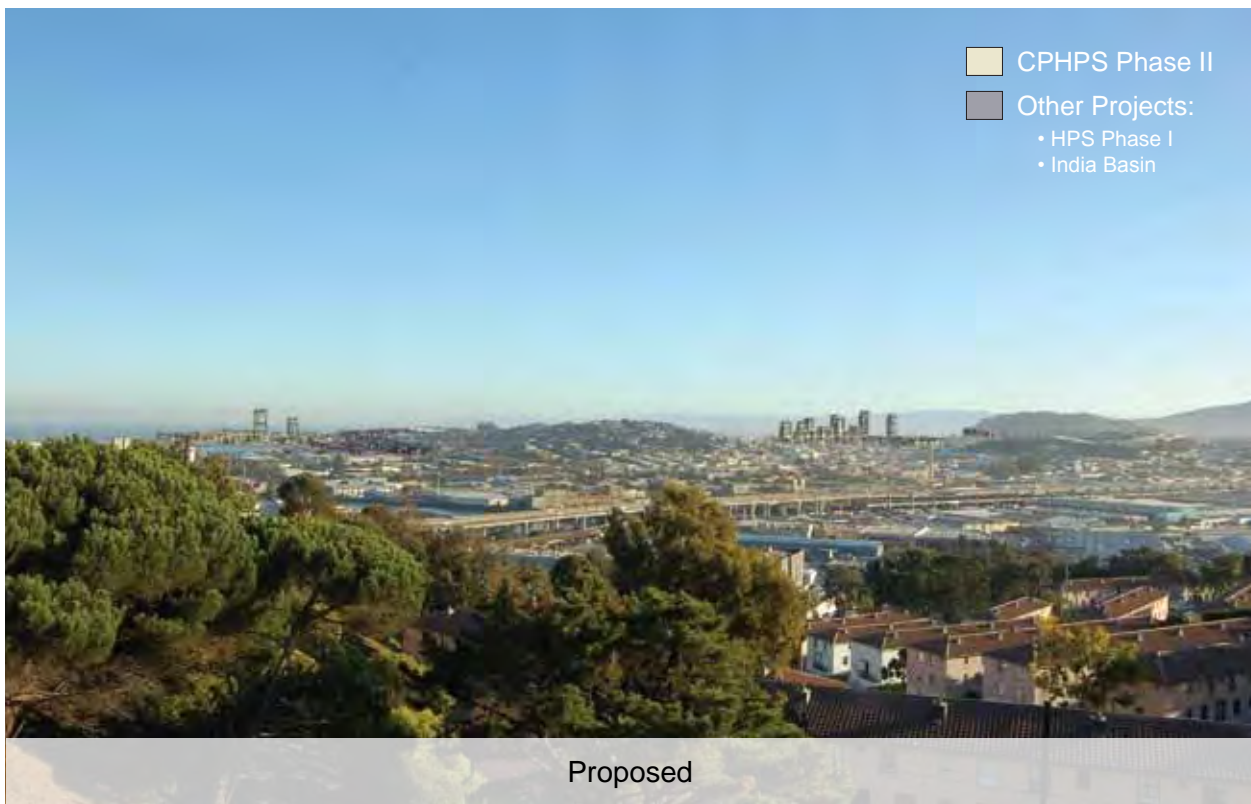
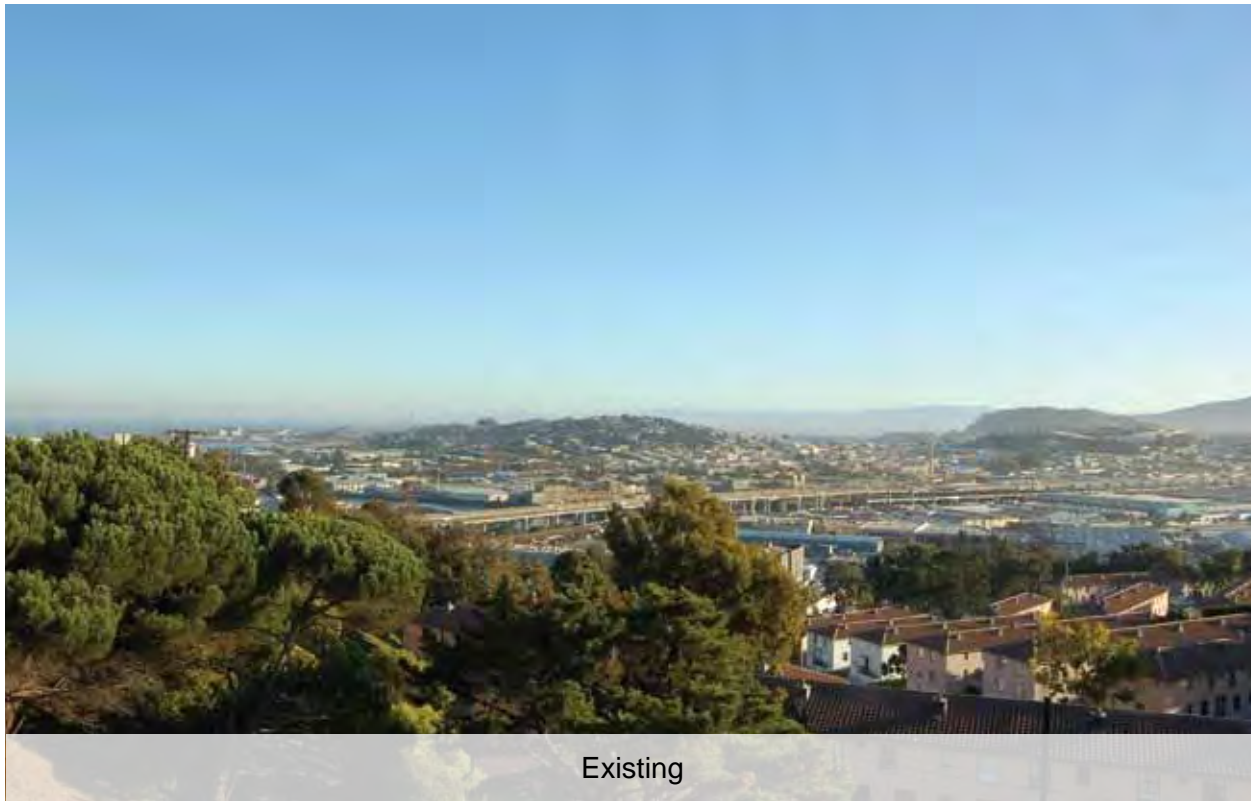
SOURCE: Lennar Urban, 2009.

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



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



- CPHPS Phase II
- Other Projects:
 - HPS Phase I
 - Executive Park

Proposed

SOURCE: Lennar Urban, 2009.

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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



- CPHPS Phase II
- Other Projects:
 - HPS Phase I
 - India Basin
 - Visitacion Valley

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

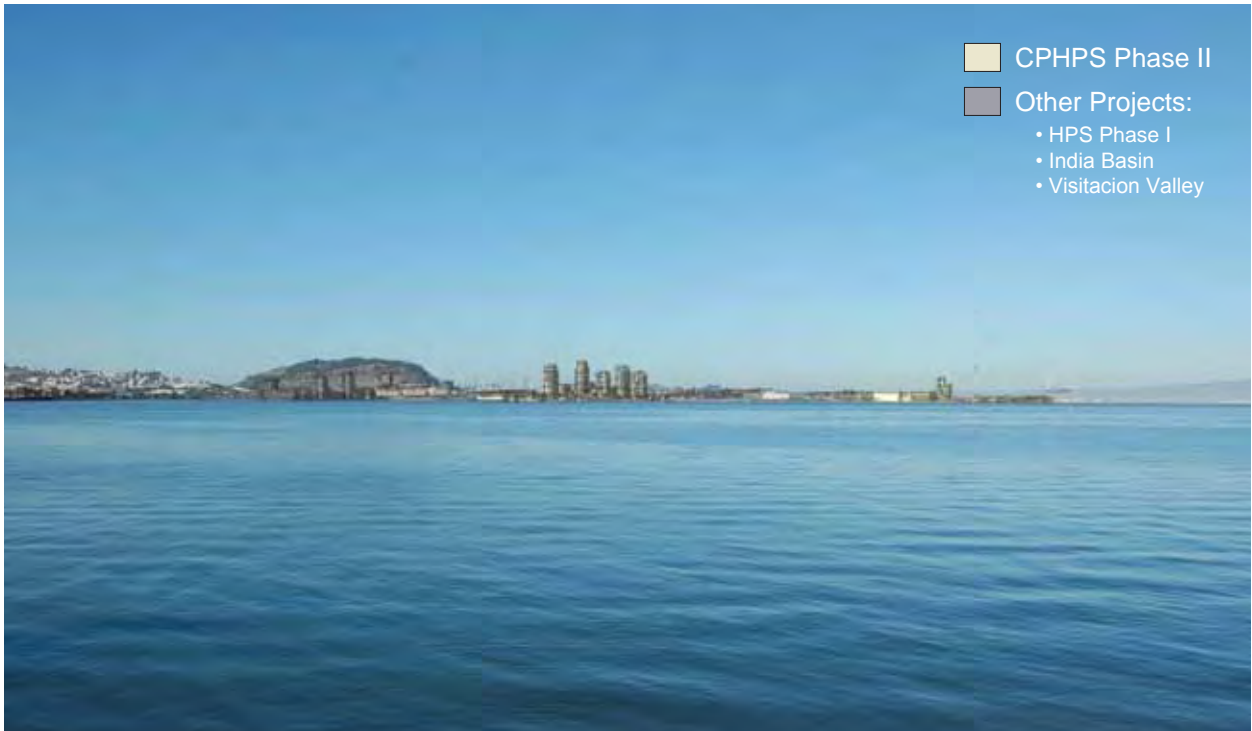
FIGURE III.E-17



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



Existing



Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.30.09 08068 | JCS | 09

FIGURE III.E-26



Candlestick Point — Hunters Point Shipyard Phase II EIR
VIEW 16: SOUTHWEST FROM MARINER VILLAGE



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



Existing



Proposed

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 Baysshore 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 views 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 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 Ballpark¹³⁶ 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-candle¹³⁷ 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.

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.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR
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 — Hunters Point Shipyard Phase II EIR
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 parks, 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 — Hunters Point Shipyard Phase II EIR
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 — Hunters Point Shipyard Phase II EIR
CANDLESTICK POINT: SHADOW PATTERNS — DECEMBER 21 (NOON PST)

▲ **FIGURE III.F-4**



SOURCE: Lennar Urban, RHAA, CADD, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
CANDLESTICK POINT: SHADOW PATTERNS — DECEMBER 21 (3 PM PST)

FIGURE III.F-5



SOURCE: Lennar Urban, RHAA, CADD, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
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, CADD, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
CANDLESTICK POINT: SHADOW PATTERNS — MARCH 21 (NOON PST)

▲ **FIGURE III.F-7**



SOURCE: Lennar Urban, RHAA, CADD, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
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 — Hunters Point Shipyard Phase II EIR
CANDLESTICK POINT: SHADOW PATTERNS — JUNE 21 (10 AM PDT)

FIGURE III.F-9



SOURCE: Lennar Urban, RHAA, CADD, 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, CADD, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
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 — Hunters Point Shipyard Phase II EIR
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 — Hunters Point Shipyard Phase II EIR
CANDLESTICK POINT: SHADOW PATTERNS — SEPTEMBER 21 (NOON PDT)

FIGURE III.F-13



SOURCE: Lennar Urban, RHAA, CADD, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
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.

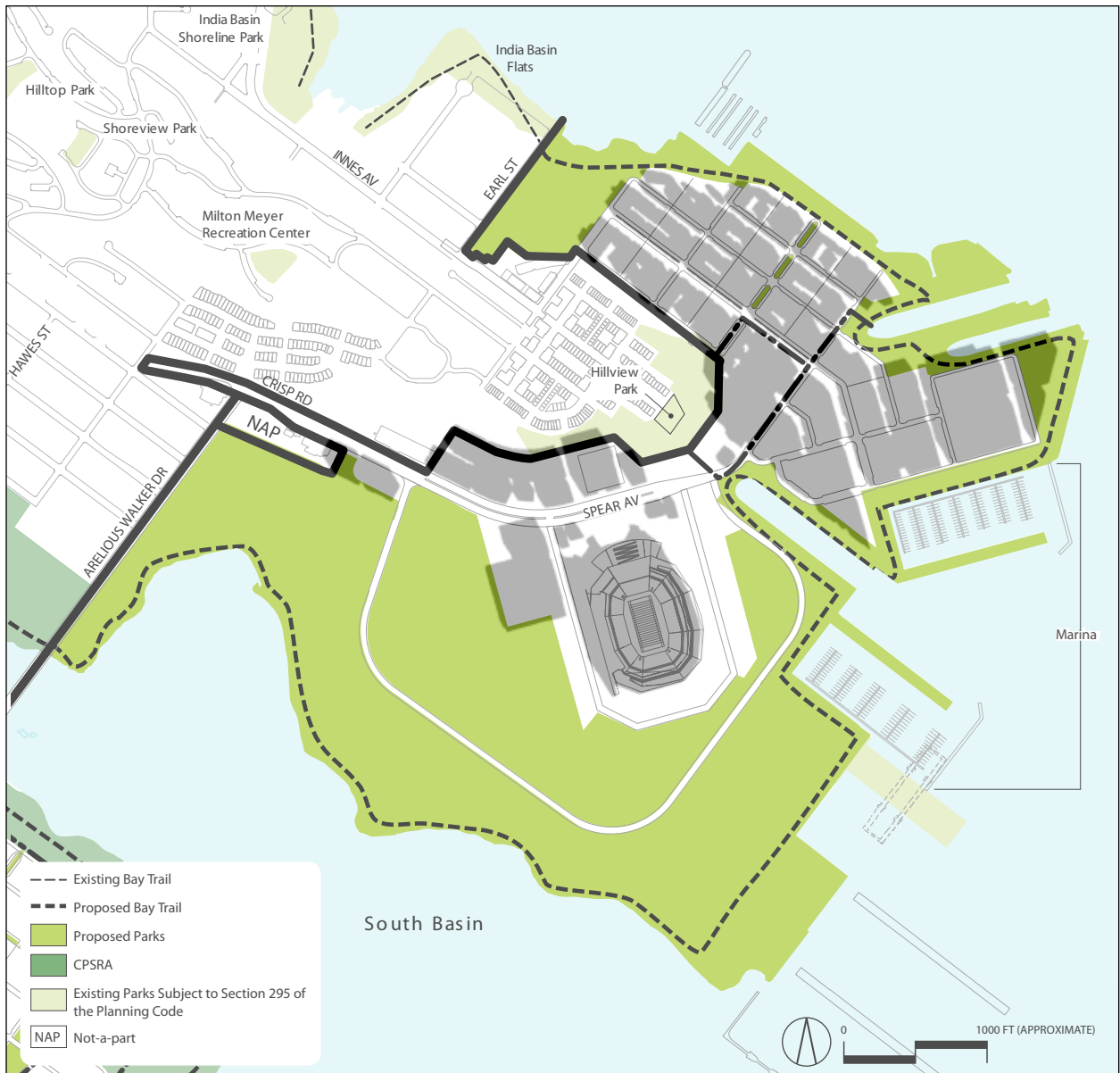


SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 PROPOSED PROJECT YEAR-ROUND SHADOW TRACE**

FIGURE III.F-15



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — DECEMBER 21 (10 AM PST)**

FIGURE III.F-16



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — DECEMBER 21 (NOON PST)**

FIGURE III.F-17



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — DECEMBER 21 (3 PM PST)**

FIGURE III.F-18

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
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — MARCH 21 (10 AM PST)**

FIGURE III.F-19



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — MARCH 21 (NOON PST)**

FIGURE III.F-20



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — MARCH 21 (3 PM PST)**

FIGURE III.F-21



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — JUNE 21 (10 AM PDT)**

FIGURE III.F-22



SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — JUNE 21 (NOON PDT)**

FIGURE III.F-23



SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — JUNE 21 (3 PM PDT)**

FIGURE III.F-24

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
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — SEPTEMBER 21 (10 AM PDT)**

FIGURE III.F-25



SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — SEPTEMBER 21 (NOON PDT)**



FIGURE III.F-26



SOURCE: Lennar Urban, RHAA, CADP, 2009.

Clement Designs 11-2-09

Candlestick Point — Hunters Point Shipyard Phase II EIR
**HUNTERS POINT SHIPYARD PHASE II:
 SHADOW PATTERNS — SEPTEMBER 21 (3 PM PDT)**

FIGURE III.F-27

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

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

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 and 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.

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* *Building Design Wind Analysis. 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.

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 Circle¹⁶⁷), 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.

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.

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, weak 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 (O₃)** 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** ($\text{PM}_{2.5}$) 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

Pollutant	Averaging Time	State Standard ^a		Federal Standard ^b		Pollutant Health and Atmospheric Effects	Major Pollutant Sources
		Concentration	Attainment Status	Concentration	Attainment Status		
Ozone	1-Hour	0.09 ppm	N	— ^c	— ^c	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.
	8-Hour	0.070 ppm	N	0.075 ppm	N		
Carbon Monoxide	1-Hour	20 ppm	A	35 ppm	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.
	8-Hour	9.0 ppm	A	9 ppm	A		
Nitrogen Dioxide	1-Hour	0.18 ppm	A	—	A	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	Annual	0.030 ppm	A	0.053 ppm	A		
Sulfur Dioxide	1 Hour	0.25 ppm	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.
	24-Hour	0.04 ppm	A	0.14 ppm	A		
	Annual	—	—	0.030 ppm	A		
Particulate Matter (PM ₁₀)	24-Hour	50 µg/m ³	N	150 µg/m ³	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).
	Annual	20 µg/m ³	N	— ^d	—		
Fine Particulate Matter (PM _{2.5})	24-Hour	—	—	35 µg/m ^{3.e}	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 , SO ₂ , and organics.
	Annual	12 µg/m ³	N	15 µg/m ³	A		
Lead	Monthly	1.5 µg/m ³	A	—	—	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.
	Quarterly	—	—	1.5 µg/m ³	A		
	3-Month Rolling	—	—	0.15 µg/m ³	U		
Sulfates	24-Hour	25 µg/m ³	A	No Federal Standard	—	Decrease ventilatory function, aggravate asthmatic symptoms, and increase risk of cardiopulmonary 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

Pollutant	Averaging Time	State Standard ^a		Federal Standard ^b		Pollutant Health and Atmospheric Effects	Major Pollutant Sources
		Concentration	Attainment Status	Concentration	Attainment Status		
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 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.boaagmd.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/m³ = micrograms per cubic meter

- a. California standards for O₃, CO (except Lake Tahoe), SO₂ (1-hour and 24-hour), NO, suspended particulate matter—PM₁₀, 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 PM₁₀ 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 PM₁₀ standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m³. The 24-hour PM_{2.5} standard is attained when the 3-year average of 98th percentiles is less than 65 µg/m³.
- 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 PM₁₀ standard on September 21, 2006.
- e. USEPA lowered the 24-hour PM_{2.5} standard from 65 µg/m³ to 35 µg/m³ in 2006 and issued attainment status designations for the 35 µg/m³ standard on December 22, 2008. USEPA designated the SFBAAB as nonattainment for the 35 µg/m³ 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), NO₂, PM₁₀, 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						
<u>2008 Estimated</u>						
Total Emissions	1,748	378	448	62	212	81
Mobile Source Emissions	1,542	183	381	15	20	16
San Francisco						
<u>2008 Estimated</u>						
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/emsmv/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 PM₁₀ 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, PM₁₀, and PM_{2.5}. For ozone, the SFBAAB does not meet either the state or federal standards. For PM₁₀ 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 µg/m³ to 35 µg/m³ in 2006 and issued attainment status designations for the 35 µg/m³ standard on December 22, 2008. USEPA designated the SFBAAB as nonattainment for the 35 µg/m³ 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 PM₁₀ standard was exceeded five times while the federal 24-hour PM₁₀ standard was not exceeded. For this time period, the annual average was above the state standard of 20 µg/m³. 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 µg/m³ and federal 15 µg/m³ 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 (PM₁₀)			
Annual average concentration measured ^a	22.9 µg/m ³	21.9 µg/m ³	22.0 µg/m ³
Maximum 24-hour concentration measured ^d	61.4 µg/m ³	69.8 µg/m ³	41.3 µg/m ³
Days exceeding federal 150 µg/m ³ 24-hour standard	0	0	0
Days exceeding state 50 µg/m ³ 24-hour standard	3	2	0
Fine Particulate Matter (PM_{2.5})			
Annual average concentration measured ^a	9.7 µg/m ³	8.7 µg/m ³	9.8 µg/m ³
Maximum 24-hour concentration measured	54.3 µg/m ³	45.2 µg/m ³	29.4 µg/m ³
No. of days exceeding federal 35 µg/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 (NO₂)			
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. µg/m³ = 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 µg/m³ to 35 µg/m³. PM_{2.5} exceedance days for 2006 to 2008 reflect the new 35 µg/m³ standard.
- f. Insufficient data available per California ARB.

¹⁷³ BAAQMD formerly maintained a Bayview monitoring station, but monitoring activities ceased in 2005.

- ① 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 µg/m³) was comparable to the other sites, but exceeded the federal standard. Conversely, the annual average PM_{2.5} (10.3 µg/m³) 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 Project¹⁷⁵ 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 PM₁₀ 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 PM₁₀ concentrations at these five locations ranged from 16.9 to 20 µg/m³, 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 µg/m³, with the minimum and maximum measurements reported at the Potrero Recreation Center and Southeast Community Center, respectively.

Toxic Air Contaminants and PM_{2.5}

- ① 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 Monitoring 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).

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		Unit Risk (per $\mu\text{g}/\text{m}^3$)	Cancer Risk ^b (Chances in one million)
	(ppb)	($\mu\text{g}/\text{m}^3$)		
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; $\mu\text{g}/\text{m}^3$ = 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, NO₂, SO₂, PM₁₀, 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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 unhealthy 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 PM₁₀ 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 PM₁₀ 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 µg/m³ (micrograms per cubic meter), Section 3807 requires development on the site to be designed or relocated to avoid exposure greater than 0.2 µg/m³, 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 µg/m³ 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 µg/m³ 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 PM₁₀

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-PM₁₀ 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-PM₁₀ 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 1×10^{-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 1×10^{-5} (10 in a million)
- Ground level concentrations of noncarcinogenic air contaminants/pollutants resulting in a HI greater than 1 for the MEI

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 µg/m³) identified by SFDPH¹⁹⁰ were considered less than significant for CEQA purposes. The rationale provided by SFDPH for the 0.2 µg/m³ action level included studies suggesting that “a change in ambient concentrations of PM_{2.5} by 0.2 µg/m³, independent of other vehicle pollutants would result in significant forecasted health impacts” (2008).
- The 0.2 µg/m³ 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 µg/m³.”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 µg/m³) is consistent with the SFDPH threshold of 0.2 µg/m³. The BAAQMD reached that conclusion based on an ARB report that determined an increase in mortality from a 0.3 µg/m³ increment of PM_{2.5} was consistent with the estimated increase in mortality assumed by SFDPH in identifying the 0.2 µg/m³ increment. BAAQMD further states that “On balance, the Air District estimates that the SFDPH threshold and the [District proposed threshold of 0.3 µg/m³], 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 µg/m³, 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 PM₁₀ 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 2007¹⁹³ 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.

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 PM₁₀ 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-PM₁₀ 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 PM₁₀).

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 (PM₁₀) 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. PM₁₀ emissions evaluated include demolition and soil grading activities associated with Project construction activities. Those Project areas where PM₁₀ 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 PM₁₀ 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-PM₁₀ 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-PM₁₀ 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 µg/m³–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, PM₁₀ 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 PM₁₀ dust control measures to be implemented.²⁰²

To minimize dust emissions, *San Francisco Health Code* (Article 22B) and the BAAQMD²⁰³ 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 HRA²⁰⁴ 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., pickups) 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-PM₁₀ 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-PM₁₀ 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 HHRA were evaluated for HPS and CP.

- HPS—The Navy directed a series of comprehensive environmental investigations and HHRA 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 HHRA 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 PM₁₀ 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-PM₁₀ 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-PM₁₀. (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 (PM₁₀) and pose health risks to nearby receptors on- and off site. As described earlier, an HRA evaluated the potential concentrations of the airborne soil-PM₁₀ 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 PM₁₀ experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM₁₀ 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-PM₁₀ 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 PM₁₀ 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-PM₁₀. (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 (PM₁₀) and pose health risks to nearby receptors on and off site. As described earlier, an HRA evaluated the potential concentrations of the airborne soil-PM₁₀ 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 PM₁₀ experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM₁₀ 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-PM₁₀ 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 PM₁₀ 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-PM₁₀. (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-PM₁₀ and an HRA evaluated the potential concentrations of the airborne soil-PM₁₀ 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 PM₁₀ experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM₁₀ 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-PM₁₀ 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 PM₁₀ 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, PM₁₀, 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 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, PM₁₀, 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

Intersection	One-Hour Average CO (ppm) ^a			Eight-Hour Average CO (ppm) ^a		
	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 HRA²⁰⁷ 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.

- ⓪ 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 µg/m³ 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 PM₁₀ 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-PM₁₀ 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 PM₁₀ 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 through 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, PM₁₀ (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 µg/m³ 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 PM₁₀ (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 PM₁₀.

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 evaluate risks and hazards from construction exhaust can be used to evaluate the proposed PM_{2.5} standard of 0.3 µg/m³. 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, NO_x, PM₁₀ (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 µg/m³ has been proposed

Impact Conclusion Based on Draft Guidelines

The proposed mass emission limits for ROG, NO_x, PM₁₀ (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)	PM₁₀ (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, PM₁₀, 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 µg/m³. As the proposed

BAAQMD standard is $0.3 \mu\text{g}/\text{m}^3$, 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
- $\text{PM}_{2.5}$ concentration threshold of $0.8 \mu\text{g}/\text{m}^3$ 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 $\text{PM}_{2.5}$ 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/ $\text{PM}_{2.5}$ 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 energy²¹⁰ 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:

$$L_{eq} = 10 \times \log\left(\frac{1}{n} \times (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})\right)$$
 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		<i>L_{eq}</i>	<i>Exposure Time</i>	<i>L_{max}</i>
<i>Specific Environment</i>	<i>Critical Health Effect(s)</i>	<i>(dBA)</i>	<i>(hours)</i>	<i>(dB)</i>
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 L_n 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})

<i>Location ID</i>	<i>Measurement Location Description</i>	<i>Saturday 10 Jan 2009</i>	<i>Sunday 11 Jan 2009</i>	<i>Monday 12 Jan 2009</i>
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 (L₉₀)

<i>Location ID</i>	<i>Measurement Location Description</i>	<i>Saturday 10 Jan 2009</i>	<i>Sunday 11 Jan 2009</i>	<i>Monday 12 Jan 2009</i>
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 (L₉₀) at Night

<i>Location ID</i>	<i>Description</i>	<i>Range</i>	<i>Median</i>
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-curb 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).

Noise Receptor	Land Use Description	Noise Level			Primary Noise Source
		L_{eq}	L_{min}	L_{max}	
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
3 rd south of Carroll Avenue	Residential	40	62.8
Caesar west of 3 rd Street	Residential	60	59.
Palou Avenue east of 3 rd Street	Residential	40	56.8
Ingalls north of Carroll Avenue	Residential	30	56.7
Carroll Avenue east of 3 rd Street	Residential	60	52.6
Gilman Avenue east of 3 rd 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).

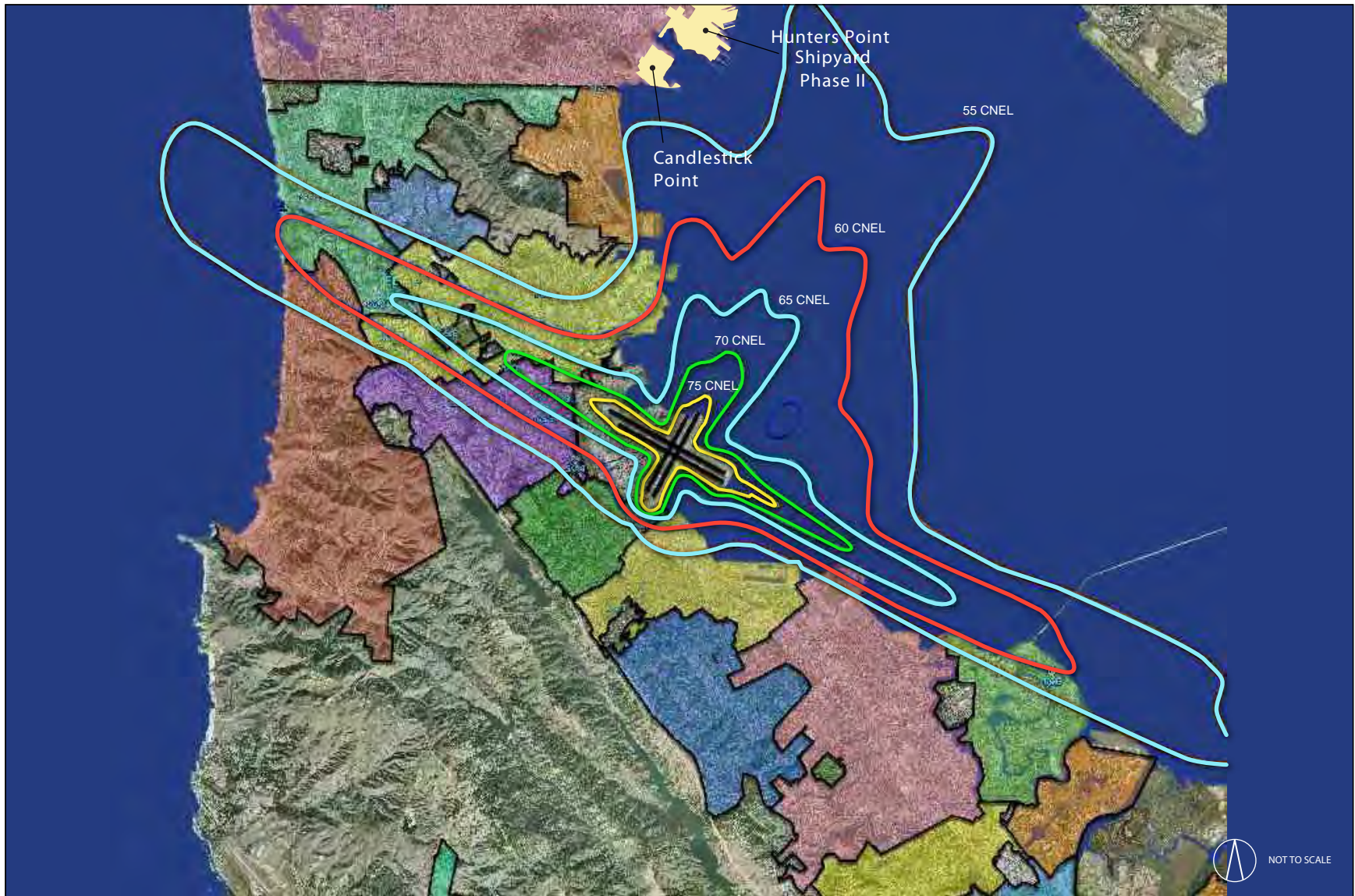
Existing Aircraft Noise Levels on the Project Site

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.



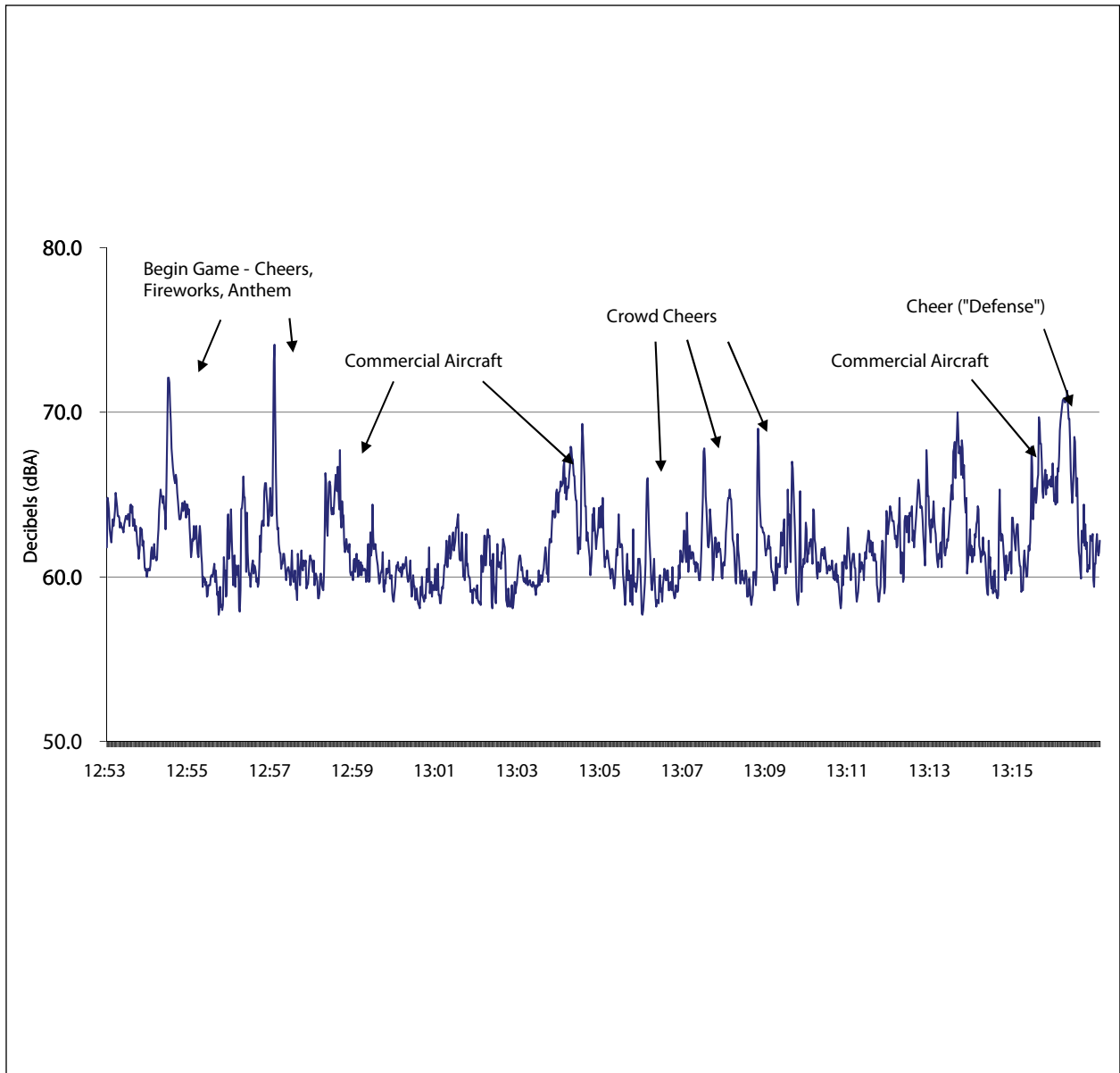
SOURCE: 65 CNEL noise contour, <http://tx-sfo.airportnetwork.com/#>.

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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
**MONSTER PARK SOUND LEVELS (49ers vs Tampa Bay Dec. 23, 2007)
 AT JAMESTOWN CONDOMINIUMS**

◀ **FIGURE III.I-4**

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	$L_{eq}(24 \text{ hr}) < 70 \text{ dBA}^a$	All areas.
Outdoor activity interference and annoyance	$L_{dn} < 55 \text{ dBA}$	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	$L_{eq}(24 \text{ hr}) < 55 \text{ dBA}$	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} < 45 \text{ dBA}$	Indoor residential areas.
Indoor activity interference and annoyance	$L_{eq}(24 \text{ hr}) < 45 \text{ dBA}$	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).

<i>Residences and Buildings Where People Normally Sleep^a</i>		<i>Institutional Land Uses with Primarily Daytime and Evening Uses^b</i>	
<i>Existing L_{dn} (dBA)</i>	<i>Allowable Noise Increment (dBA)</i>	<i>Existing Peak Hour L_{eq} (dBA)</i>	<i>Allowable Noise Increment (dBA)</i>
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 L_{90} 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 added²²² (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.

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

<i>Equipment</i>	<i>Typical Noise Level (dBA) 50 ft from Source</i>
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**
EXISTING 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		
<i>Distance (Meters)</i>	<i>PPRF (dBA)</i>	<i>CB (dBA)</i>
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.

<i>Equipment</i>	<i>Approximate VdB</i>			
	<i>25 Feet</i>	<i>50 Feet</i>	<i>75 Feet</i>	<i>100 Feet</i>
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 along 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).

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
3 rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	1.0	1	No
Cesar Chavez Boulevard west of 3 rd Street	Residential	59	63.5	63.5	0	2	No
Palou Avenue east of 3 rd 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 3 rd Street ^a	Commercial	52.6	53.8	58.1	4.3	3	Yes
Gilman Avenue east of 3 rd 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

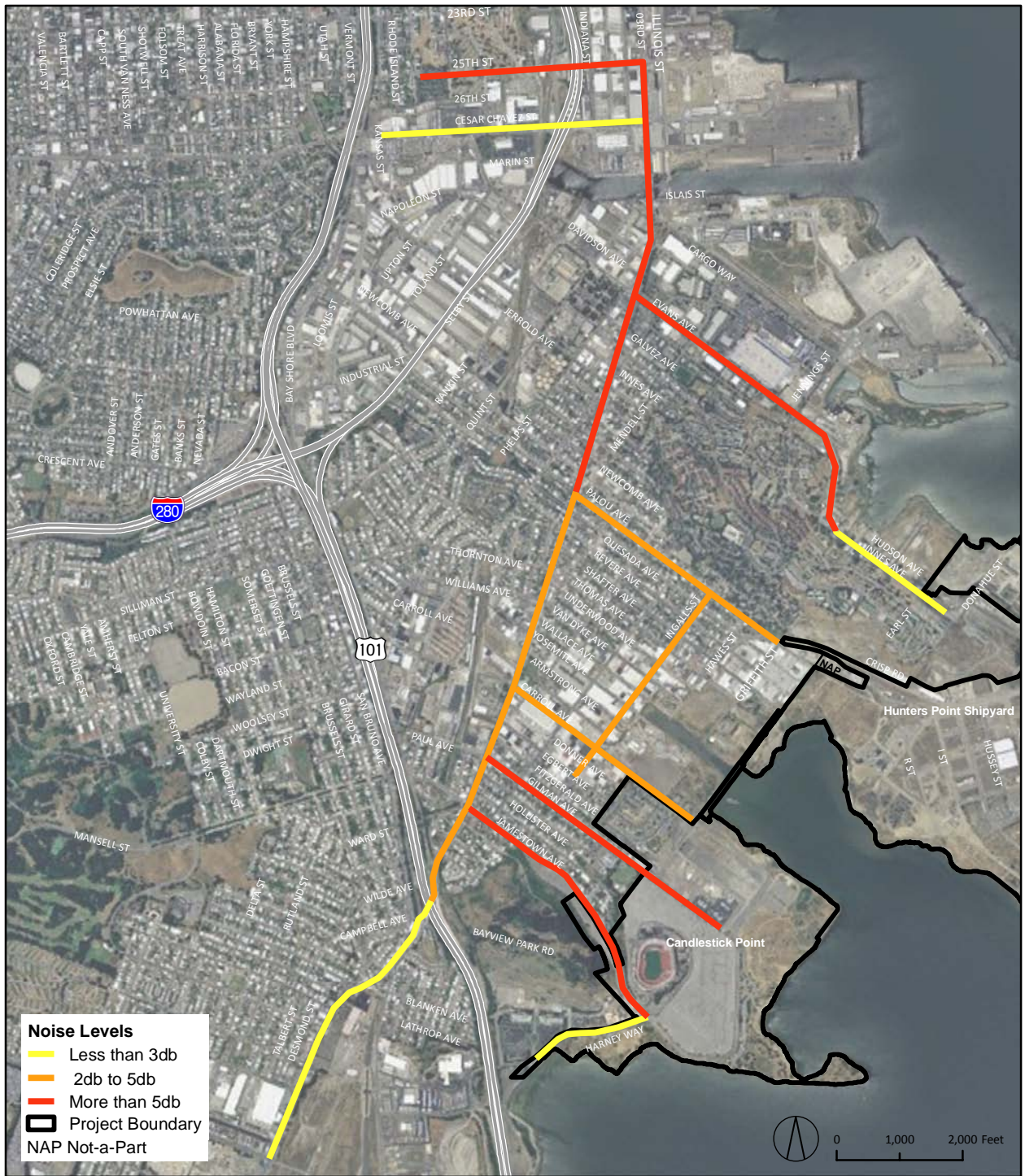
Noise model data sheets are available in Appendix I3 (Traffic Noise Model Output)

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 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.

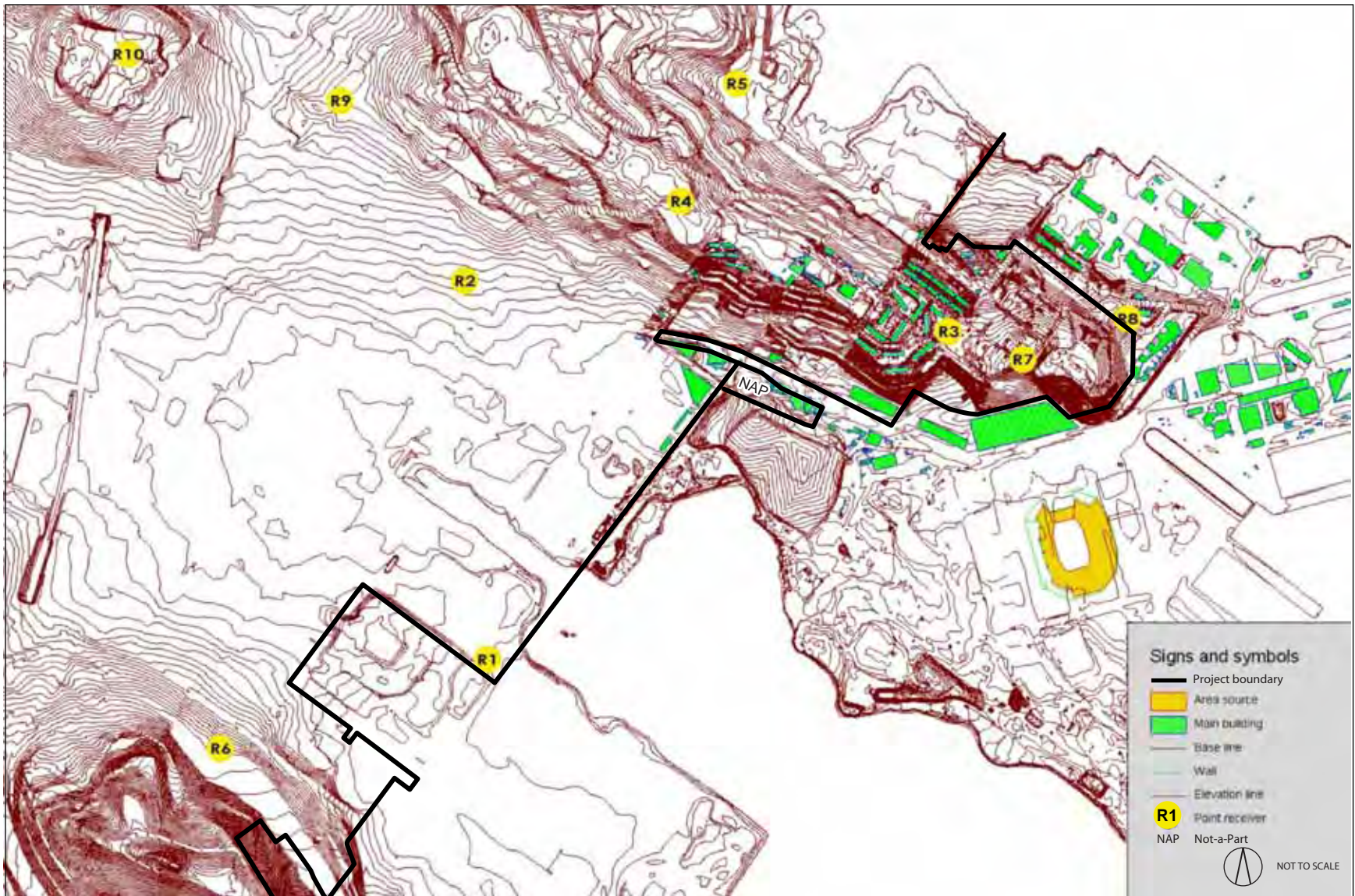
c. Based on noise energy summation of measured or assumed ambient plus SoundPLAN® predicted game noise levels.

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				Exterior Game L_{max}	Detectable Outdoors?	Interior Game	
		L_{10} (dBA)	L_{50} (dBA)	L_{90} (dBA)	L_{max} (dBA)			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
3 rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	5.5	2	Yes
Cesar Chavez Boulevard west of 3 rd Street	Residential	59	63.5	63.5	4.5	3	Yes
Palou Avenue east of 3 rd 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 3 rd Street	Commercial	52.6	53.8	58.1	5.5	5	Yes
Gilman Avenue east of 3 rd 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.

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.

① ²²⁹ 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]).

① ²³⁴ 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 vermilion), 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 *Petlennuc*) 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 *Petlennuc*, 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 wall²⁴⁰ 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 Point 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 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 be 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 be 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

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

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 Project²⁵⁵ 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.

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.

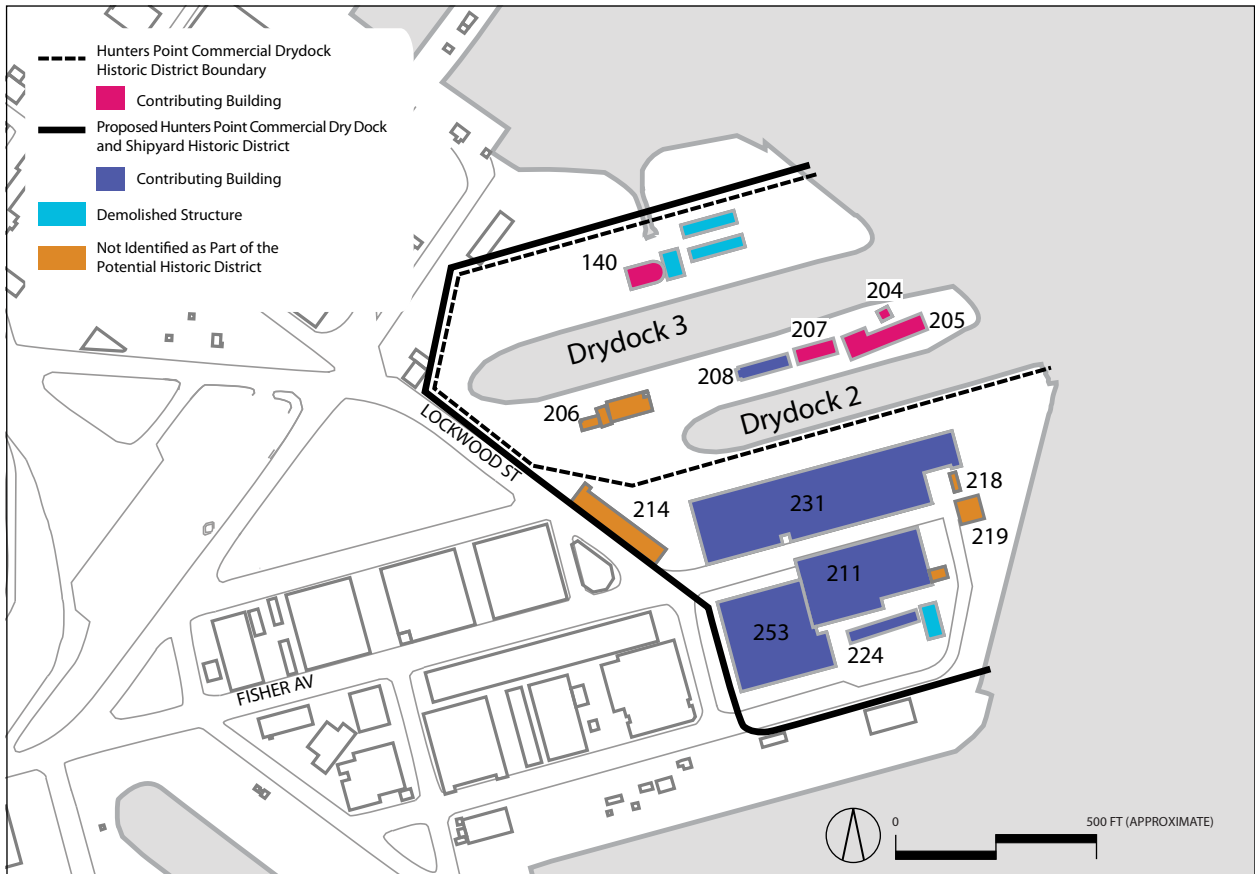
The Office of Historic Preservation Directory of Properties in the Historic Property Data File included Drydocks 2 and 3 pump houses (Buildings 205 and 140), the western portion of Drydock 1, the Gatehouse (Building 204), and the Paint and Tool Building (Building 207) as the only structures on HPS considered 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:

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

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 agency²⁶⁶

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 CEQA²⁷⁰ 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 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 (serpentine, 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 (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 measures²⁷⁵ 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.

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
**HUNTERS POINT SHIPYARD PHASE II
 HAZARDOUS MATERIALS CONDITIONS**

FIGURE III.K-1

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	
<i>Hunters Point Shipyard Parcel Designation</i>	<i>Proposed HPS Phase II Districts</i>
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. 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.

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

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

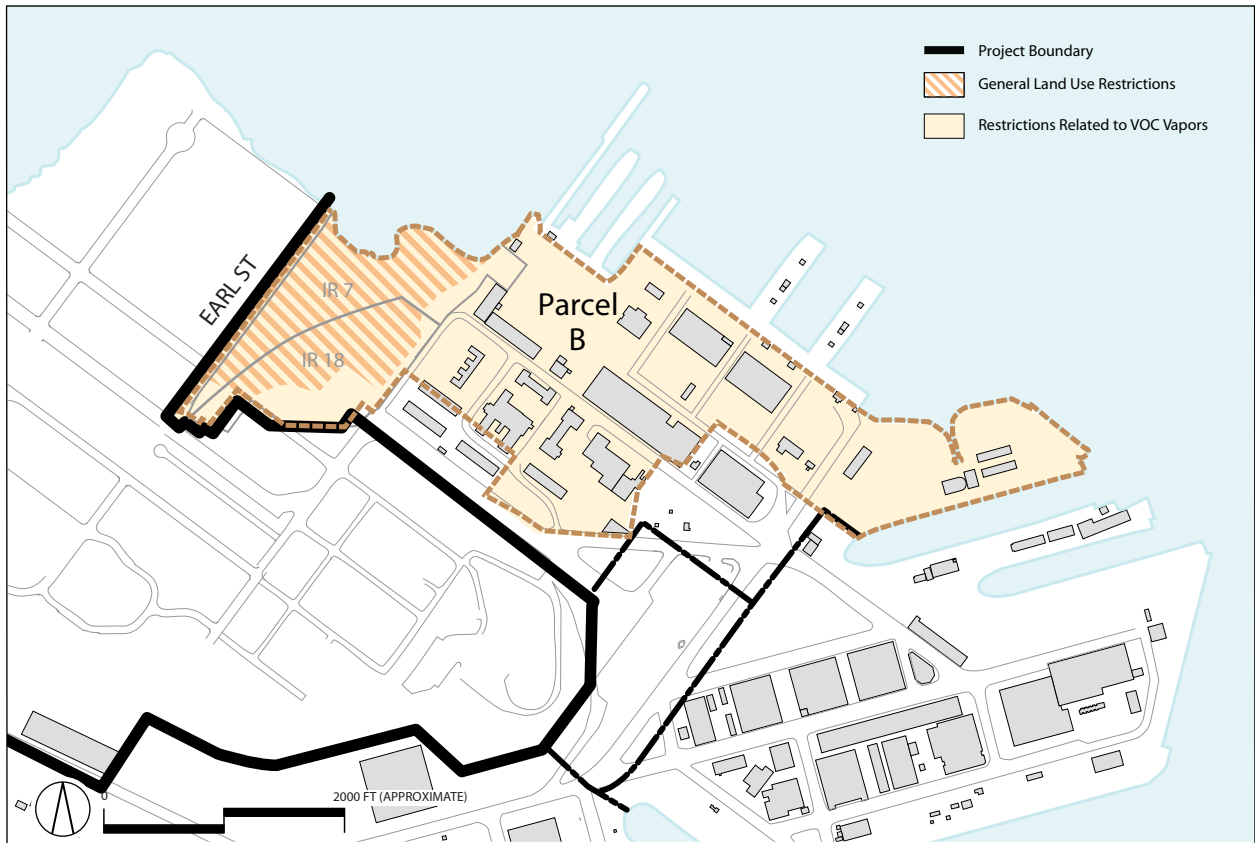
²⁹² Department of Navy, *Final Amended Record of Decision for Parcel B*, January 14, 2009. This document is on file for public review at the San Francisco Redevelopment Agency, One South Van Ness Avenue, Fifth Floor as part of File No. ER06.05.07, or at the Planning Department, 1650 Mission Street, Fourth 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 Plan, 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 NRD. 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

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-1, D-2, G, and UC-1. Three RODs were prepared: one combined ROD for Parcels D-1 and UC-1 and one each for Parcel D-2 and Parcel G. The Navy issued a ROD for Parcel G in February 2009³⁰⁵ 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

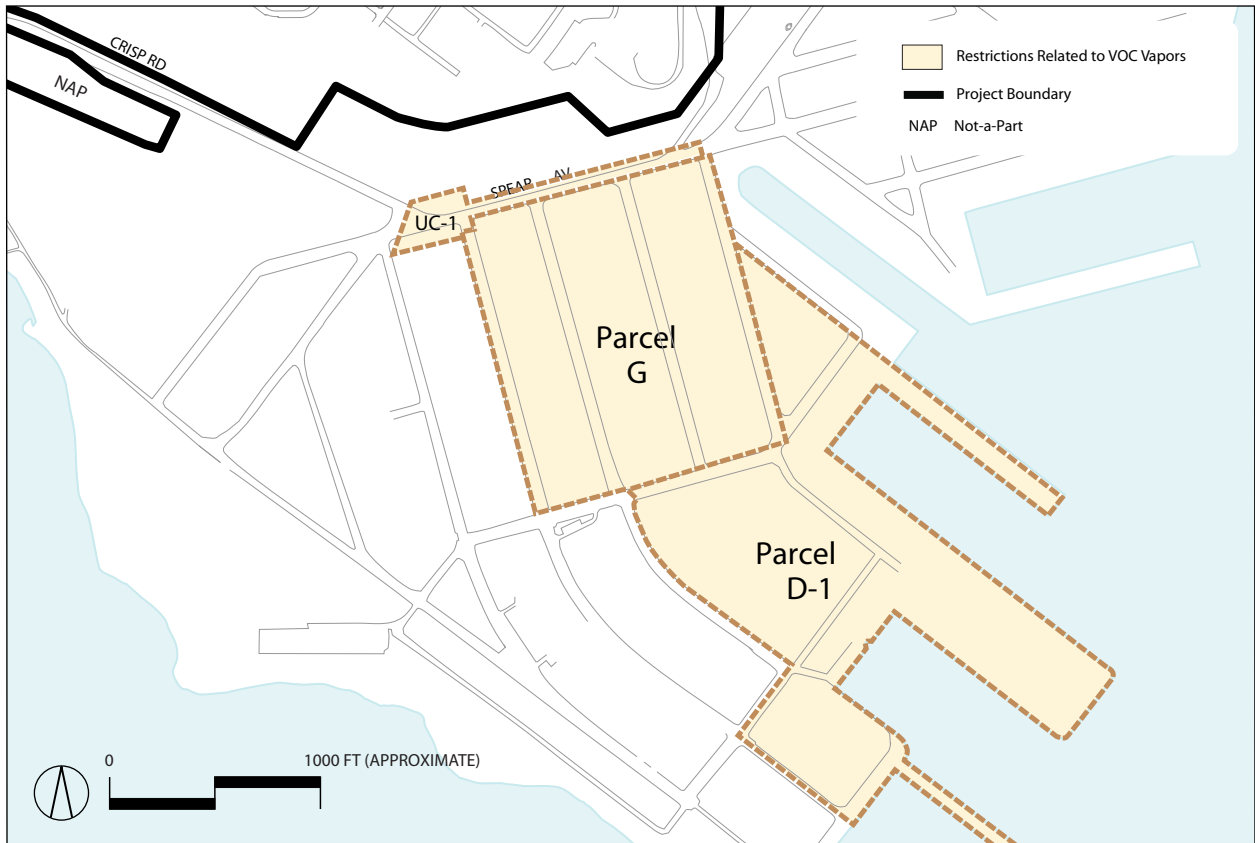
In September 2004, the Navy divided the original Parcel E into two parcels: Parcel E and Parcel E-2. Parcel E consists of 138 acres of shoreline and lowland area in the southern portion of HPS. Nearly all of the Parcel E land area was created using artificial fill. Most of Parcel E is covered by annual 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.

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

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 property³¹⁵ 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.

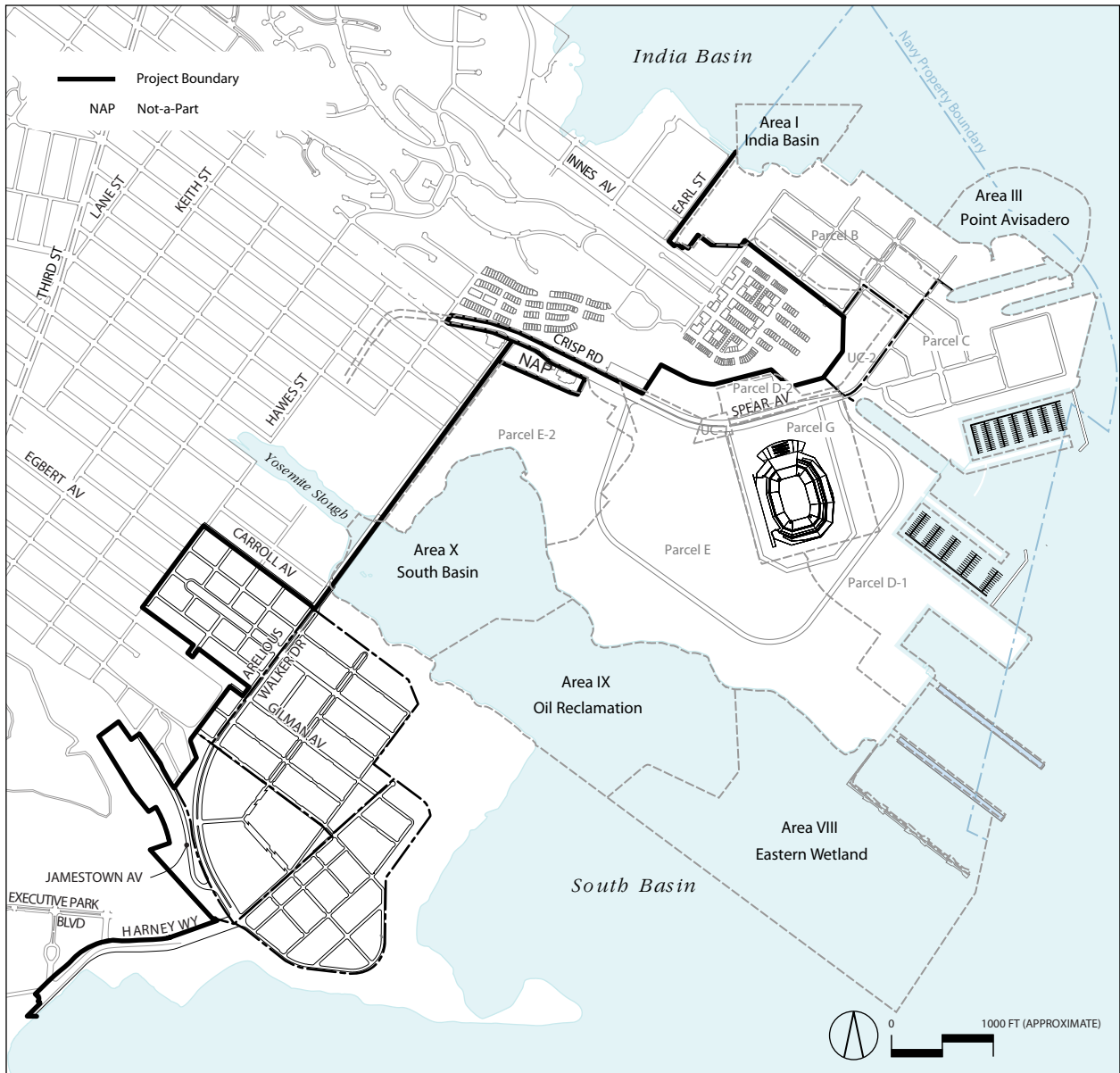
HPS Parcel F: Results of Environmental Investigations

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

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 environmental 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

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 LIFO, as explained previously, under CERCLA, the terms of the lease or LIFO 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 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 PM₁₀, 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.

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. Serpentine 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 serpentine.

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 risk³³⁴ 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 (1×10^{-6}) and the quantified values that are compared to the criterion represent the *probability* of occurrence that exposure to carcinogenic materials would exceed—in other 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.

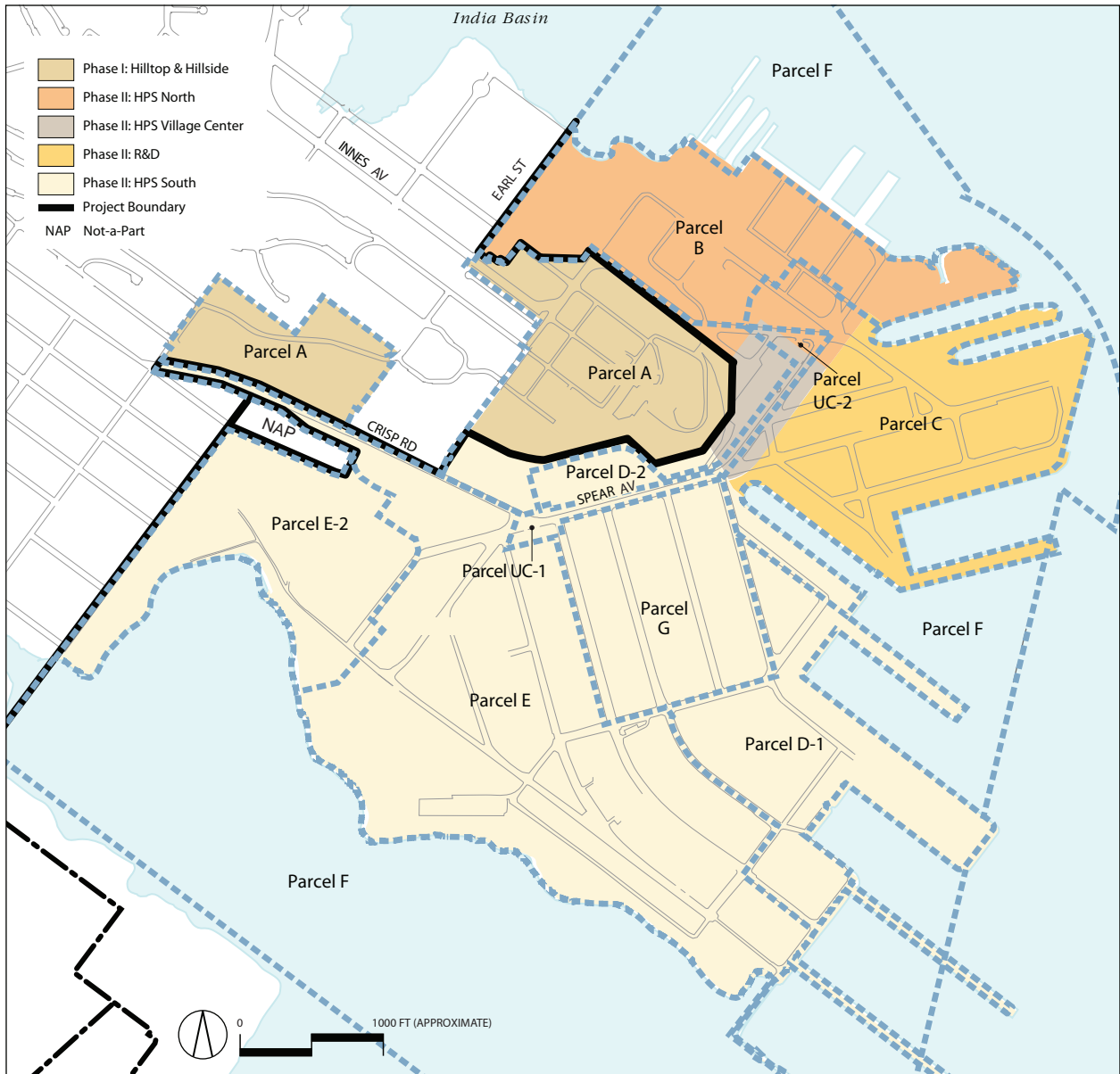
Management of Hazardous Materials Contamination Risks During Development

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.

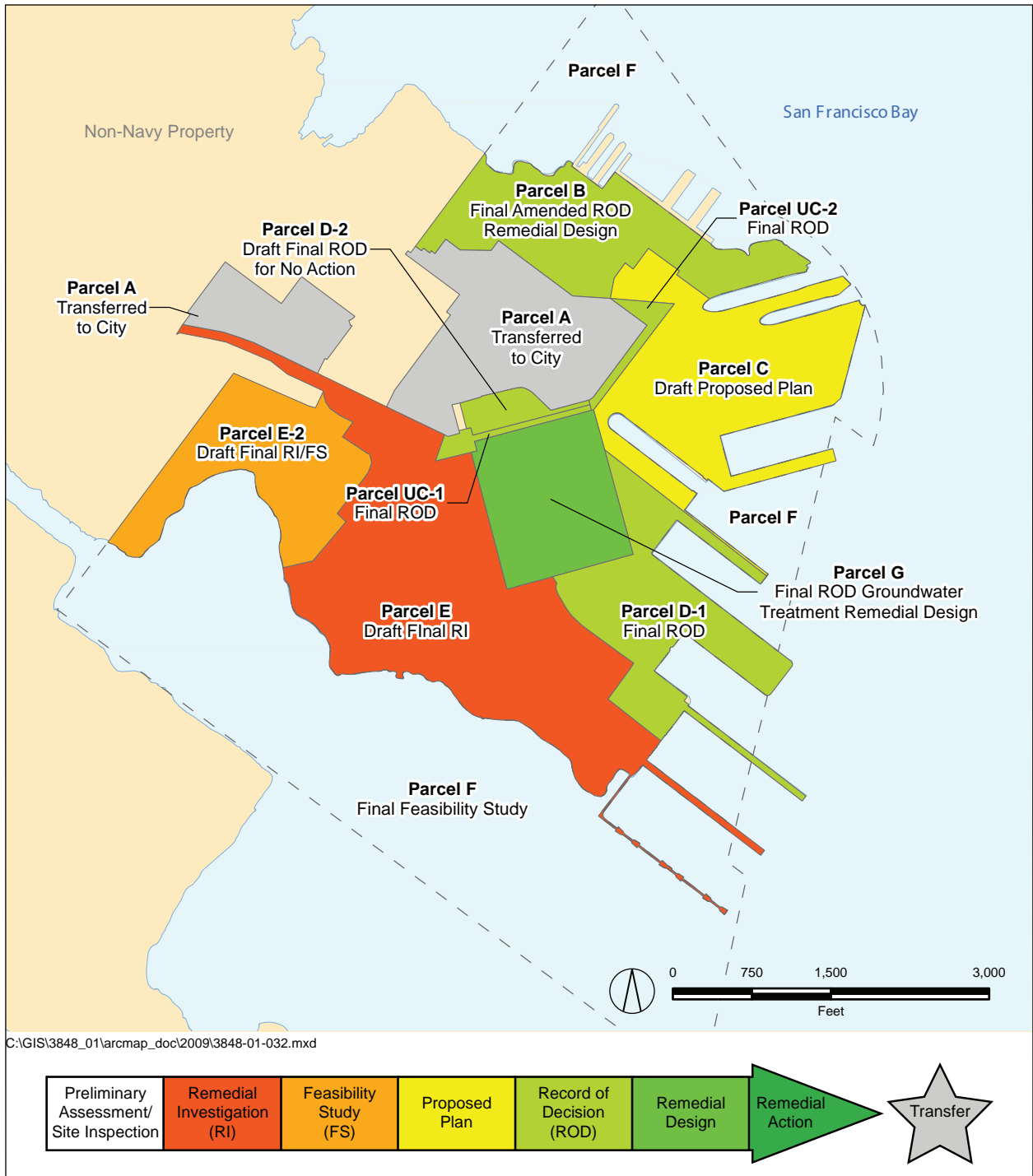


SOURCE: Lennar Urban, 2009.

PB5&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
STATUS OF CERCLA PROCESS

FIGURE III.K-6

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 FOSSL, 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 LIFO, as explained previously, under CERCLA, the terms of the lease or LIFO 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 LIFOs, 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 FOSE/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

Remedial Action	Parcels in Which Remedial Action Could Occur					Potential Environmental Effects and Sources	Methods to Reduce Effects
	B	C, UC-2	D (includes D-1, UC-1, and G)	E/E-2	F		
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

Remedial Action	Parcels in Which Remedial Action Could Occur					Potential Environmental Effects and Sources	Methods to Reduce Effects
	B	C, UC-2	D (includes D-1, UC-1, and G)	E/E-2	F		
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

Remedial Action	Parcels in Which Remedial Action Could Occur					Potential Environmental Effects and Sources	Methods to Reduce Effects
	B	C, UC-2	D (includes D-1, UC-1, and G)	E/E-2	F		
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 begins, 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.

- ④ 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.
- ④

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 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 environmental 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.

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 PM₁₀ 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.

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 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 mélangé 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

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
- Qs r – Slope debris and Ravine fill
- Qu – Undifferentiated surficial deposits

Franciscan Complex

- KJ s – Sanstone and Shale
- KJ c – Chert
- KJ g – Greenstone
- KJ u – 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.

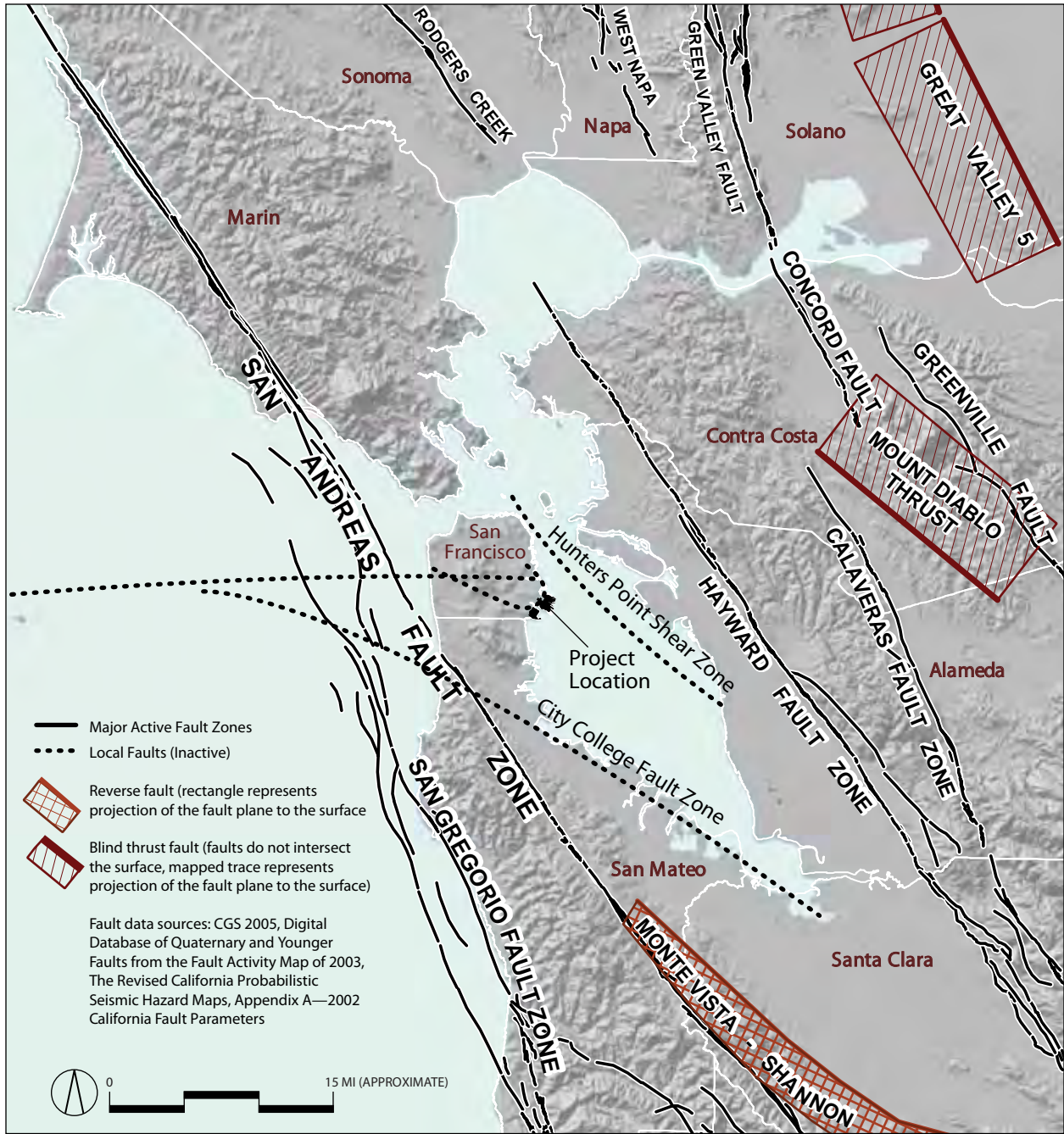
Table III.L-1 Summary of Geologic Units at Candlestick Point			
Geologic Unit	Map Symbol	Age	Lithology
Artificial Fill	Qaf	Historic (0-200 years old)	Mixture of sand, gravel, and some clay. Abundant debris including wood, glass, and brick.
Slope Debris and Ravine Fill	Qsr	Holocene to Pleistocene (0-1.8 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

<i>Geologic Unit</i>	<i>Map Symbol</i>	<i>Age</i>	<i>Lithology</i>
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

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.

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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Liquification 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

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.

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 extent³⁹⁰. 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.

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 Structures⁴⁰⁷ 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.

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 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

<i>Districts</i>	<i>Geotech Subparcel</i>	<i>Existing Grades</i>	<i>Proposed Grading</i>	<i>Artificial Fill</i>
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

<i>Districts</i>	<i>Geotech Subparcel</i>	<i>Existing Grades</i>	<i>Proposed Grading</i>	<i>Artificial Fill</i>	<i>Young Bay Mud</i>	<i>Depth to Bedrock</i>
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

<i>Districts</i>	<i>Geotech Subparcel</i>	<i>Existing Grades</i>	<i>Proposed Grading</i>	<i>Artificial Fill</i>	<i>Young Bay Mud</i>	<i>Depth to Bedrock</i>
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

<i>Subareas</i>	<i>Geotech Subparcel</i>	<i>Development Type</i>	<i>Proposed Geotechnical Remediation</i>	<i>Proposed Foundations</i>
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.

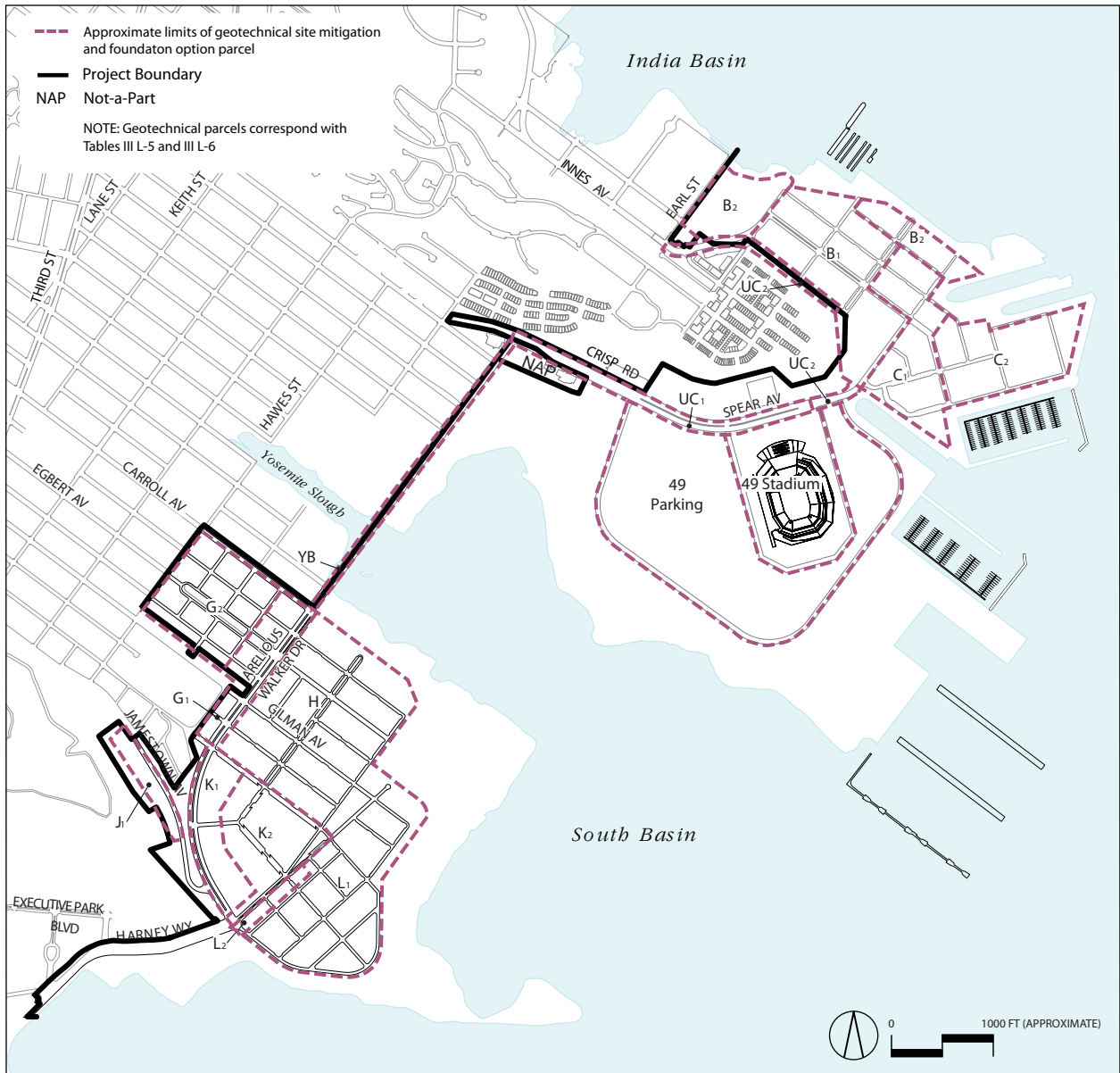
SOURCE: ENGeo, May 2009

Table III.L-8 Geotechnical Treatment for HPS Phase II Geotechnical Subparcels

<i>Subareas</i>	<i>Geotech Subparcel</i>	<i>Development Type</i>	<i>Proposed Geotechnical Remediation</i>	<i>Proposed Foundations</i>
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

<i>Facility</i>	<i>Condition Rating</i>	<i>General Comments</i>
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	Advanced deterioration, open corrosion spalls with exposed rebar, spalls 6 inches deep.
	Sta. 10+60 to south edge of pile supported Berth 2 (U/W)	
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 capping.
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 capping. 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 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

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.a.1 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 geogrid⁴¹⁸ 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 1/4 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 geogrid⁴²³ 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.*

⁴²² CGS, 2000.

⁴²³ Geogrids are synthetic fabrics (fiberglass, polyester, treated steel, etc.) formed into nets with openings more than 1/4 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 ENGE0, 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 enforced 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 (°F); the average low temperature is 51°F. 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

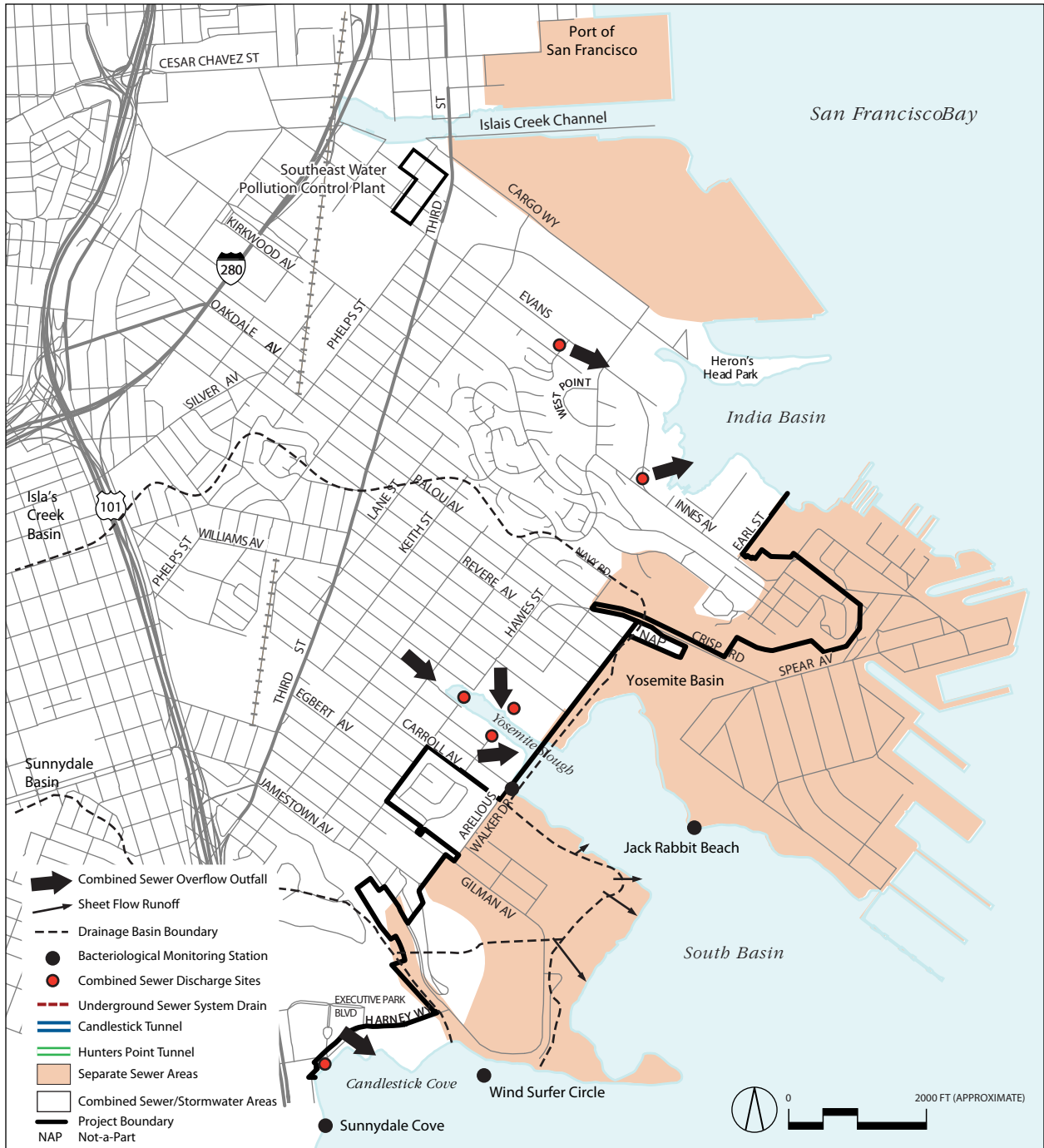
Precipitation drains as surface runoff into a network of underground and surface drainage pathways. Generally, these pathways converge into drainage culverts, streams, and/or creeks, which become progressively larger as the runoff moves downstream, eventually reaching a common discharge location. The terms "watershed" or "drainage basin" describe the area of land that drains downslope to such a location.

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. Wiczorek, 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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Candlestick Point — Hunters Point Shipyard Phase II EIR
**COMBINED AND SEPARATE STORM SEWER SYSTEM
 AND RECEIVING WATER BODIES**

FIGURE III.M-1

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) structures⁴⁵⁰ are also located along the Islais Creek Channel.⁴⁵¹

Yosemite Basin

The Yosemite Basin encompasses approximately three square miles⁴⁵² 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

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

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.

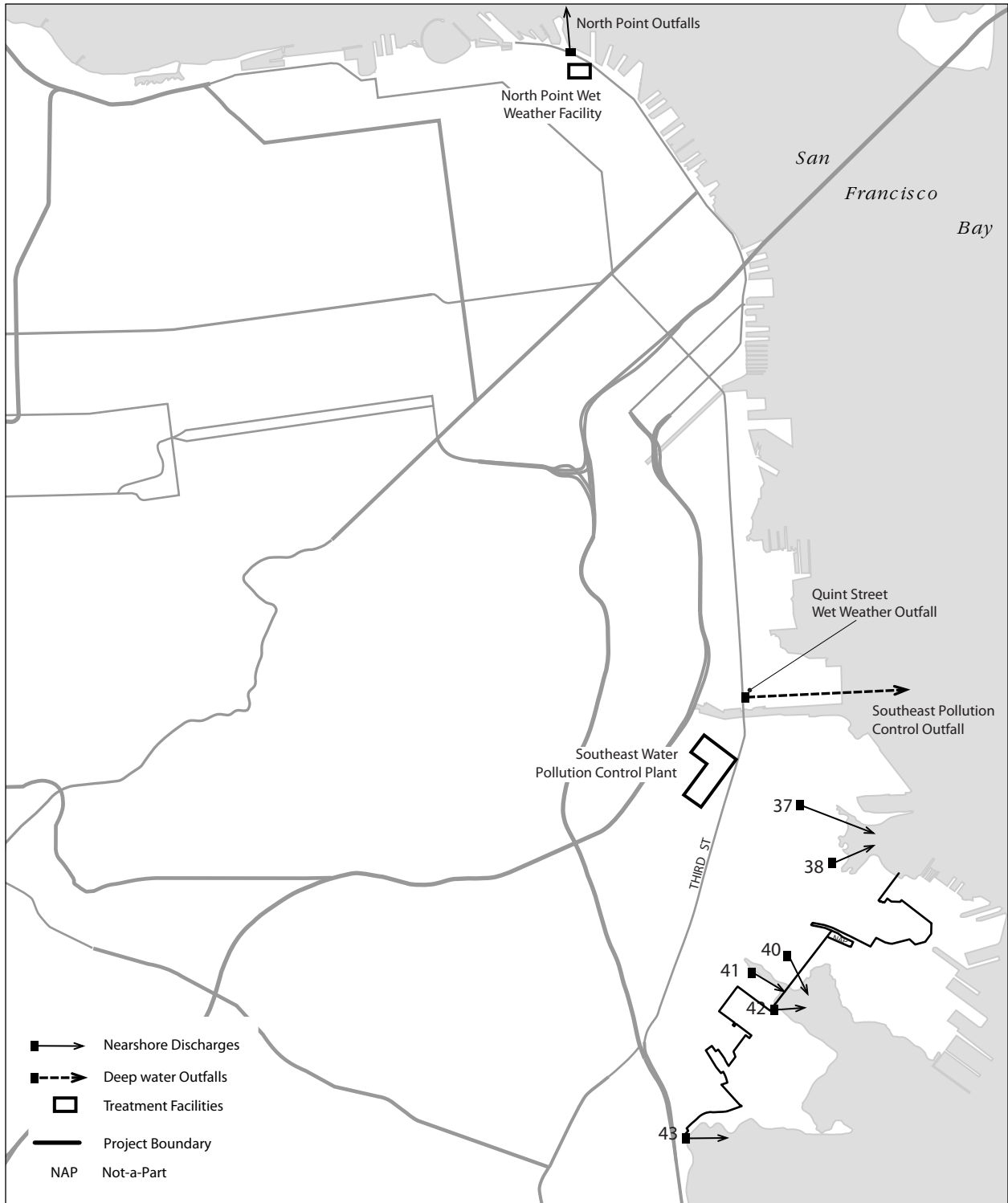
If the combined wet-weather flows exceed 150 MGD, the plant can also treat an additional 100 MGD to a primary treatment standard (removal of settleable materials) plus subsequent disinfection and dechlorination.⁴⁶⁰ Wet weather flows that are treated to the primary standard (plus disinfection) are only 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 (BWFF), which consist of a series of interconnected underground tanks, tunnels, and outfall structures. During dry weather, the BWFFs 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 BWFFs 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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Candlestick Point — Hunters Point Shipyard Phase II EIR
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

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.

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:

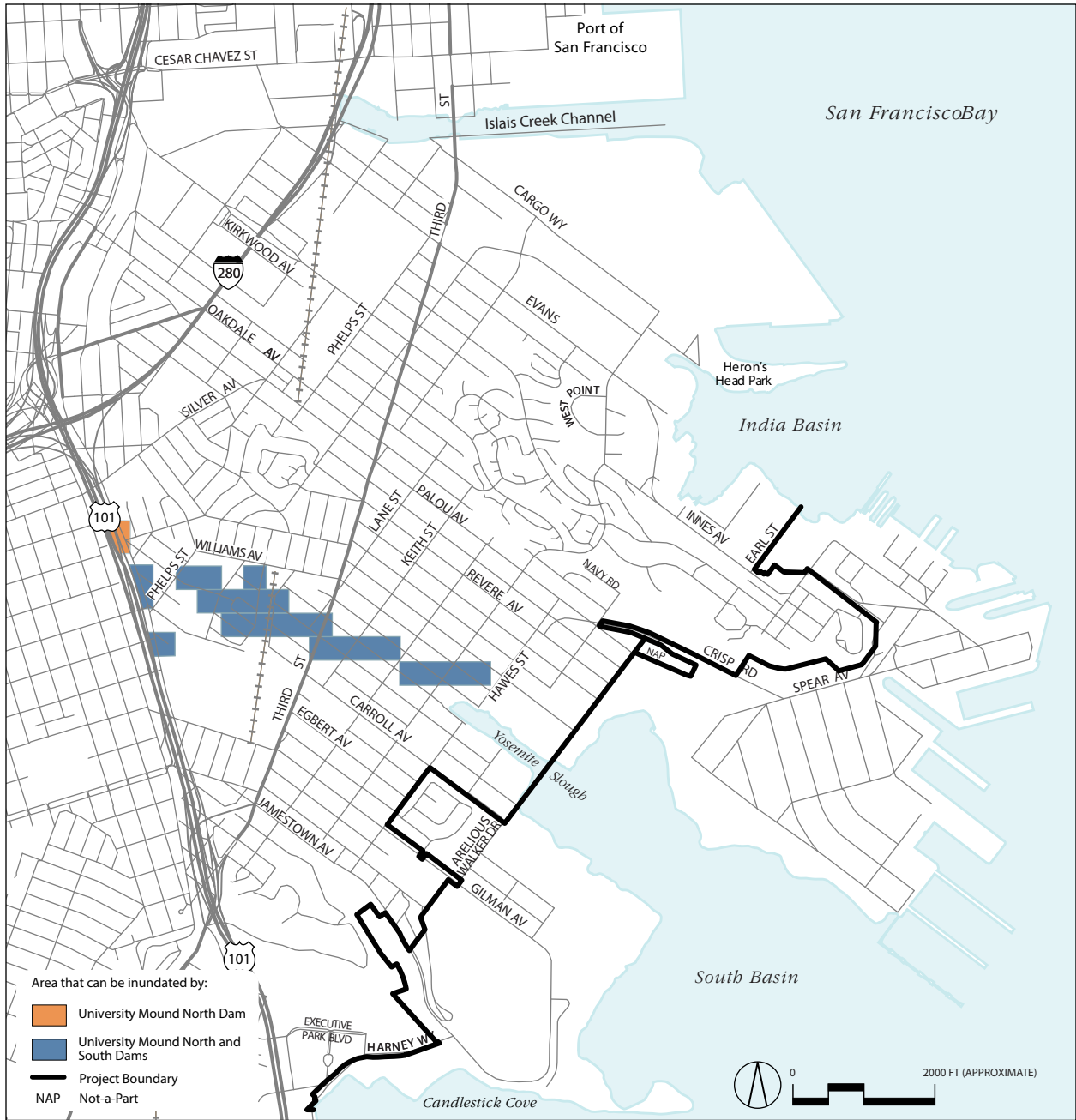
- Zone A: Areas with a one percent annual chance of flooding; no Base Flood Elevations determined
- Zone V: Coastal areas with a 1 percent or greater chance of flooding and an additional hazard associated with storm waves; no Base Flood Elevations determined⁴⁷⁰

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.



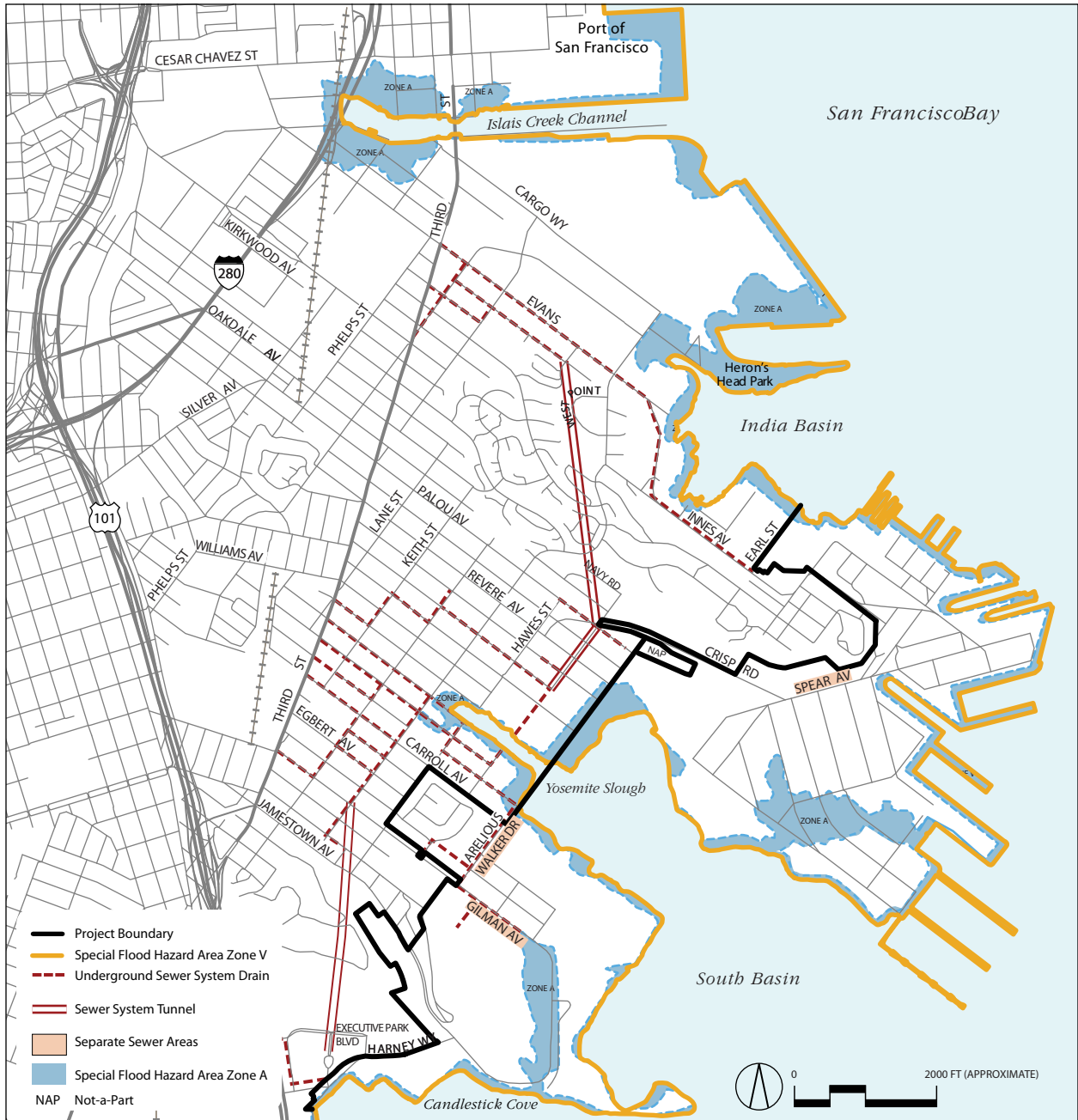
SOURCE: ABAG, 1995.

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Candlestick Point — Hunters Point Shipyard Phase II EIR
DAM FAILURE INUNDATION AREAS IN THE PROJECT VICINITY



FIGURE III.M-3



SOURCE: FEMA firm (Draft).

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Candlestick Point — Hunters Point Shipyard Phase II EIR
**PRELIMINARY 100-YEAR FLOOD ZONES WITHIN AND
 ADJACENT TO THE PROJECT**



FIGURE III.M-4

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

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

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 Nichol⁴⁹³ 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

⁴⁸⁵ Stanford SOLAR Center, 2008, *Global Warming*, website: <http://solar-center.stanford.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.

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.

PBS&J 11.2.09 08068 | JCS | 09

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			
<i>Others</i>	<i>Units</i>	<i>Value</i>	<i>Description</i>
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 (90 th 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), µg/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 bacteria⁵⁰⁴ 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 benchmarks⁵⁰⁵ 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.

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 spot⁵¹⁵ 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.

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 sources⁵²⁷ 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

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}

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

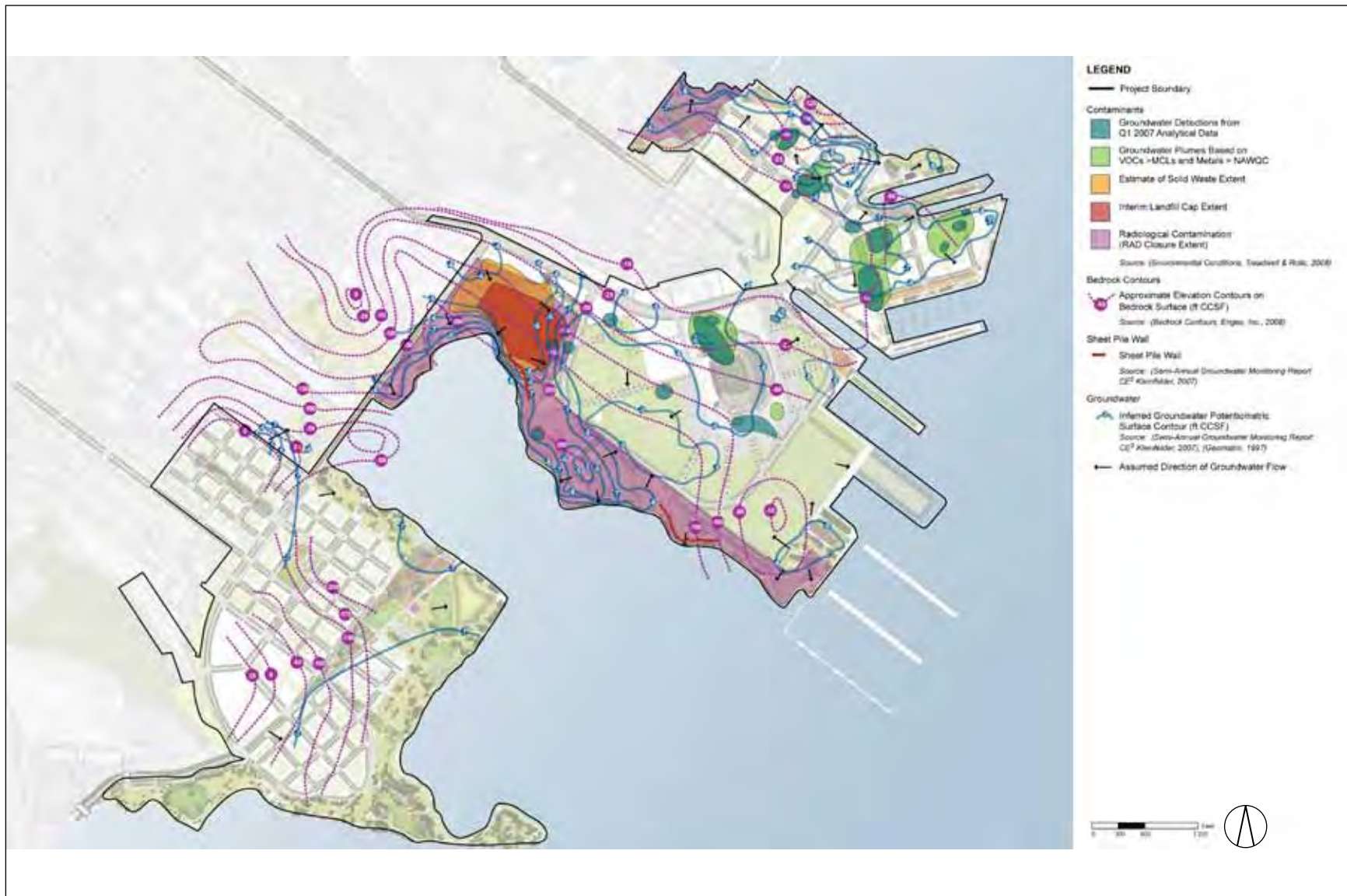
⁵³⁹ California Department of Water Resources (DWR), 2003, op. cit.

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/vwsoalphabetical/Hunters+Point+Naval+Shipyard?OpenDocument#threats> (accessed September 23, 2009).

⁵⁴² Ibid.

⁵⁴³ Ibid.



SOURCE: ARUP, 2009.

PBS&J 11.2.09 08068 | JCS | 09

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/sfbaymercurytml.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 allocations⁵⁴⁵ 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 benchmarks⁵⁵¹ 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 Plan⁵⁵² 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 benthic⁵⁵³ 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 SQOs 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 permit⁵⁵⁵ 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/transport 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

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 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:

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 Guidelines⁵⁶³ 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, *op. cit.*

⁵⁶³ Draft Stormwater Design Guidelines were released in February 2009⁵⁶³ 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

Priority Project Categories	General Pollutant 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

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.

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-Construction⁵⁸⁴ 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 *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 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 SWPPP 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 acres⁵⁹² of impervious surfaces. Development at Candlestick Point would include residential, commercial, office, and recreational uses, which could result in approximately 165.4 acres⁵⁹³ 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 concentrations⁵⁹⁵ 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 BMPs⁵⁹⁶), which quantifies the change in annual pollutant loads⁵⁹⁷ 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.

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						
Pollutant	Existing			Project		Difference (Existing – Project)^a
	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 Guidelines⁵⁹⁸ 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 2009⁵⁹⁸ 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 Management⁶⁰⁰ 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 concern⁶⁰³ 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 than 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 acres⁶⁰⁹ 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 acres⁶¹⁰ 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 (Estimated 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				
<i>Pollutant</i>	<i>Existing (lbs)</i>	<i>Project (lbs)</i>	<i>Difference (%)</i>	<i>Off-site Residential (lbs)</i>
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 has 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 equivalent⁶¹¹ 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]**

- ⓪ 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.

- ⓪ 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 Database⁶¹⁵ 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.

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 acres⁶¹⁶ 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 acres⁶¹⁷ 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 acres⁶¹⁸ 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 acres⁶¹⁹ 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.1 would 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 Runoff⁶²¹

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 acres⁶²² 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 acres⁶²³ 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 acres⁶²⁴ 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 acres⁶²⁵ 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

Storm Event	Existing (cfs) ^b	Project (cfs) ^c	Project Increase ^a	
			(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 grade⁶²⁸ 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 surcharging⁶³¹ (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.

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.

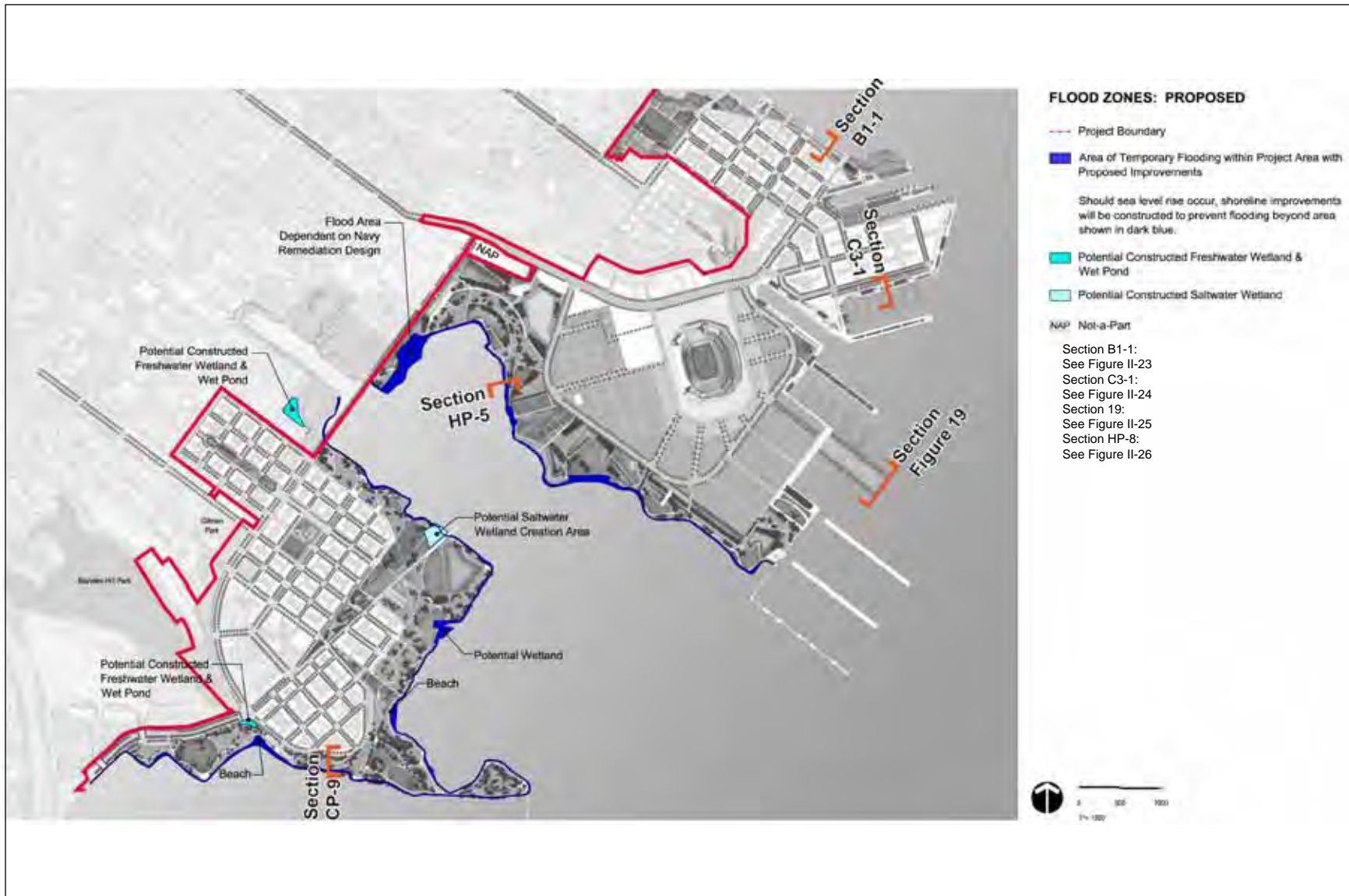
The preliminary grading plan for Candlestick Point⁵⁹⁸ shows that the site would be graded such that the finished grade would be 3 feet higher than the Base Flood Elevation, and building finish floors would be 6 inches above that (total of 42 inches above Base Flood Elevation) per MM HY-12a.1 (Figure 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 undertaken⁶³⁵ 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.

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 Center⁶⁴⁰ and the policies adopted by the California State Coastal Conservancy⁶⁴¹ 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.

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]**

- ① 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-12.a.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 site⁶⁴² 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-12.a.1 and MM HY-12.a.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 floodways⁶⁴³ 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.

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.i]

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.

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.
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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, dichloro-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.